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THE UNIVERSITY OF ALBERTA

A LANDSAT COLOR 1 CAI PROGRAM FOR GRADE SIX STUDENTS

by

© BRIAN THOMAS BURKE

A thesis
submitted to the Faculty of Graduate Studies and Research
in partial fulfilment of the requirements for the degree
of Master of Education

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA
FALL, 1983

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....
Supervisor

Don Massey

....

Date Fall 1983

DEDICATED

to

MY MOTHER

Without her love, support and understanding
this thesis would never have been completed.

ABSTRACT

The purpose of this study was to investigate the role of a microcomputer based computer-assisted instruction program for teaching grade six students about Landsat Color 1 images.

The author designed and developed a program to instruct students in Landsat Color 1 image interpretation, with the Commodore 2001 microcomputer. The program was implemented and the results of the study were evaluated.

The remote sensing Landsat CAI program was designed as an interactive tutorial program with the students receiving feedback or guidance throughout the program.

The results indicate that the grade six students in this study can learn the appropriate skills to interpret Landsat Color 1 imagery with the aid of a microcomputer based computer-assisted instruction program. The findings further indicate that the students developed a highly favorable attitude toward the Landsat CAI program.

The conclusions derived from this study suggest that computer-assisted instruction may have potential benefits for grade six students in the social studies. However, more research with a larger sample would be needed to determine the implications of the CAI for a wider parameter. Specific suggestions were made for further research problems and areas of investigation.

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CHAPTER I

THE PURPOSE: ITS BACKGROUND, NATURE AND SIGNIFICANCE

1. Introduction

Satellites using electronic sensing devices have been in existence since the 1960's. The launching of Landsat 4 has brought remote sensing into the 1980's. Data from the Landsat satellites contributes to the monitoring and management of the earth's resources. It supplements other sources of information, such as text books and maps, for the development of informed decision-making with regards to regional or global problems that affect the quality of life.

Computers, too, are an established fact in our technological society and are making inroads into all aspects of twentieth century life. These electromechanical marvels are now found in many elementary schools in Alberta.

The combination of these technologies to expand the students' skills in identifying environmental features could, in time, produce a strong concern for the preservation of the human habitat.

2. Background to the Study

The veritable explosion of scientific and technological knowledge has forced a change in the role of the teacher, from oracle and fountain of knowledge to that of guide, for discovery and evaluation of information from the most up-to-date sources, to enable students to make valid judgments on the issues concerned.

One area crucially affected by the impact of science and technology is the field of social studies. The rate of change in these fields is complicated for the social studies by lack of current information relating to the environment and the effects of man's interaction with it.[1] Landsat imagery, which is updated every sixteen days, can provide an accruate and current source of information for use in the classroom.

Today, in almost all fields of education there are many older technologies which have been used for many years in military and industrial training. The Link trainer, for example, helped to teach pilots and navigators the rudiments of blind flying during the years of World War II. The flight simulator, which has superseded it, can realistically reproduce any flight situation without injury to the aircrew or aircraft. Just as the Link trainer led to flight simulation, so too could the expansion of microcomptuer power lead to the development of teaching devices that could allow for simulation of environmental impact studies in the classroom without jeopardizing the ecology.

Could the combination of these two fields of science and technology, at the grade six level, form a foundation for concern strong enough to prompt actions by the students, such as communicating these concerns to the agencies charged with the responsibility of managing the environment.

---

[1] Joseph M. Kirman. "Preparing Social Studies Teachers for the Space Age." Journal of Aerospace Education, Vol. II. (April 1975), 18-19.

3. Purpose of the Study

The purpose of this study was to develop, explore and evaluate the potential of a microcomputer base computer-assisted (CAI) program to teach grade six students the fundamentals of Landsat satellite Color 1 image interpretation.

The program would try to teach the students the skills to interpret targets in three main areas: cultural, geographical and hydrological. The cultural features would be towns and cities, roads and railroads. The geographical targets consisted of coniferous forests, healthy vegetation, farms and fallow fields. Clear deep water and turgid water were selected for the hydrological targets.

It was felt that if it were possible to use the microcomputer as a teaching aid, rather than as a terminal for a larger computer, then this research would have opened the door for developing further material of this nature for use in the elementary grades.

As of this writing nothing was available as a criteria of measurement for the software developed for this course. An additional factor was that most of the criteria relate to mainframe programs whereas this was the first interactive tutorial program of this nature on the elementary level for a 'stand alone' microcomputer.

The author developed, administered and evaluated a four-unit computer-assisted program for this study. The teaching units dealt with the scientific and technological aspects as related to the interpretation of Landsat imagery.

4. Research Questions

The following research questions were addressed in the study:

i) Could a microcomputer based computer-assisted instruction program be devised to teach grade six students the skills of interpreting Color 1 Landsat satellite imagery?

ii) Could grade six students derive information from Color 1 Landsat imagery after using a computer-assisted Landsat instruction program?

iii) What are the students attitudes toward Landsat remote sensing CAI?

5. Definition of Terms

Acetate Overlay is the clear acetate sheet covering a map or image on which individual students mark locations, allowing one map or image to be used by more than one student, and providing a record of a student's location marks.

BASIC. Beginners All-purpose Symbolic Instruction Code. It is a programming language that is used on most microcomputers.

Color Composite Image is the image produced by assigning different colors to different bands in register to construct a photographic image.

Computer Assisted Instruction (CAI). This is the name given to a teaching process which makes use of a computer in presenting, testing and interacting with the student.

Electromagnetic Spectrum refers to the radiation wavelength regions, or bands, employed in remote sensing, ranging from ultraviolet to radar bands.

Hardware refers to the electrical, optical and mechanical devices 'on board' the satellites for use in data acquisition and transmission in remote sensing.

Invisible Spectrum is the light that cannot be detected by the human eye but which can be detected by mechanical devices.

Landsat refers to the Landsat satellites in near-polar orbit detecting multispectral electromagnetic radiation/reflectance from the earth's surface on a recurrent basis.

Landsats 1-3 refers to the first three Landsat satellites. Landsat 1 is shut down. Landsats 2 and 3 are in a standby mode effectively terminating data acquisition.

Landsat 4 is the latest Landsat satellite, launched July 16, 1982, and different in design and hardware from Landsats 1, 2 and 3.

Landsat Color 1 is a color composite image sometimes referred to as a false color infrared image where spectral band 1 is blue, band 2 is green and band 4 is red.

Landsat Image is an image produced by translating the Landsat satellite data to a photographic medium.

Multispectral Scanner (MSS) is the device on the Landsat that separates the reflected sunlight into each spectral band for recording or transmission as image data.

Near-polar Orbit is an orbital path that takes the satellite in close proximity to the poles.

Remote Sensing[2] is the science and art of obtaining information about an object, area, or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area or phenomenon under investigation.

---

[2] Thomas M. Lillesand and Ralph W. Kiefer. Remote Sensing and Image Interpretation. (New York: John Wiley & Sons, 1979), 1.

Special Band is the location of a specific electromagnetic frequency range.

Sun-synchronous refers to the correlation between the Landsat orbit, the position of the sun and the rotation of the earth enabling data acquisition to occur at the identical solar time for each 'target'.

Target is the specific area to be analyzed on a Landsat image.

Visible Spectrum is the portion of light detectable by the human eye.

6. Limitations of the Study

The following factors are recognized as limiting the generalizations made from the data collected in this study:

i) The sample for the current study was selected from one urban school with the Edmonton Catholic School System. Students in other systems, using different organizational procedures for instruction, and different curriculum materials, may differ in the particular abilities measured.

ii) Generalization based on this study will be limited by the size of the sample population.

iii) The children were tested after eight months in grade six. Consequently, generalizations would be restricted to grade six students who have spent a comparable amount of time in grade six.

7. Significance of the Study

This study represents the initial attempt to introduce Landsat Color 1 computer-assisted instruction into the grade six classroom.

CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this literature review is twofold: to examine the use of Landsat images in the field of elementary education and with a microcomputer computer-assisted instruction program as a teaching resource to introduce Landsat imagery into the classroom.

The first Landsat was launched on July 23, 1972, and operated until January 6, 1978. Landsat 2 was launched on January 21, 1975, and shut down in February of 1982. Landsat 3 was launched on March 5, 1978, and put on to "demand only" status on July 15, 1981. Landsat 4 was launched on July 16, 1982, into an orbit 705 km high. It carries more advanced remote sensing technology.[1]

Subsequent to Landsat 4 becoming operational, Landsats 2 and 3 were placed in a standby mode effectively putting an end to their data acquisition activities. Both vehicles are scheduled for permanent retirement on September 30, 1983.[2]

In 1969 Canada requested the read-out of the Landsat by the ground station at Prince Albert, Saskatchewan. This led to the development

[1] Ken Campbell, Senior Technologist, Alberta Remote Sensing Center, Edmonton. Telephone Discussion, January, 1983.

[2] Landsat Data Users Notes. Issue No. 27, June 1983. (National Oceanic and Atmosphere Administration U.S. Department of Commerce, Sioux Falls, South Dakota). 3.

of a Canadian national program in remote sensing.[3]

The University of Alberta's Faculty of Education was, and still is, in the forefront of educational institutes using Landsat imagery. Under the auspices of Project Omega research in remote sensing education continues at undergraduate and graduate student levels.[4]

Landsat imagery may be considered as an astronaut's view of the earth's surface devoid of the traditionally drawn national or regional boundaries, grid lines and other features, such as town, city or country names. It can be the basis of an accurate current map showing changes in land use or urbanization. Though a Landsat Color 1 image may differ from the traditionally acquired vertical aerial photograph in both, color and scale, its utilization in a similar manner to an aerial photograph may cause one to agree with Floyd[5] who states . . . "the aerial photograph is the ideal medium for gaining an understanding of man's impress on the land."

The evolution from aerial photogrpahy to Landsat interpretation in elementary educational research over the last two decades is reflected in the research in that field.

Dueck[6] investigated the ability of students in the intermediate grades to identify major cultural, geographical and hydrological features on a series of colored vertical aerial photographs.

---

[3] Dorothy Harper. Eye in the Sky. By L.W. Morley in Preface. (Multiscience Publications Ltd., Montreal, Canada, 1976). iii.

[4] Joseph M. Kirman. "Teachers, Students and Remote Sensing - Project Omega." Canadian Journal of Remote Sensing, Vol. 6, No. 2, (December 1980). 132-136.

[5] Barry N. Floyd. "Landscapes from the Air." Journal of Geography. LXV. (March 1966). 125.

[6] Katheryn G. Dueck. "Reading and Interpretating Vertical Aerial Photographs in the Intermediate Grades." Unpublished master's thesis, University of Calgary, 1969.

Similarly Color 1 Landsat imagery may be used as a medium to permit students to examine the surface of the earth for major cultural, geographical and hydrological features.

Kirman[7] used Landsat imagery with three classes where he had given the teachers a short course in the use of it. After the teachers had developed and taught their own units on Landsat in their classes, Kirman interviewed three children from each class - above average, average and below average. He found that these students seemed to be able to work with Landsat images to obtain data from them. This was followed up with research with 718 students that confirmed this finding.[8]

Marks[9] of Oklahoma State University worked with students from grades three to twelve. They made a Landsat mosaic of the state. This activity provided the students an opportunity to work with an abstract image and develop the orientation of the state using natural features. There were a number of follow-up activities of varying degrees of difficulty for each grade level. This has been used successfully on a state-wide basis.[10]

---

[7] Joseph M. Kirman. "The Use of Infrared False Color Satellite Images by Grades 3, 4 and 5 Pupils and Teachers." The Alberta Journal of Educational Research, Vol. XXIII, No. 1 (March 1977). 52-64.

[8] Joseph M. Kirman and Jack Goldberg. "A Landsat Color 1 Inservice Training Program for Elementary School Teachers and the mass testing of their 718 Pupils." A Supplementary Report to the Innovative Project Fund, Alberta Department of Advanced Education and Manpower, Program Service Division. September, 1980.

[9] Steven K. Marks. "Landsat Space Activities for Students." Aviation Space, Vol. VI. (January/February, 1979). 30.

In his award-winning article in the Journal of Geography Kirman[11] reported on his investigation of the use of band 5 black-and-white Landsat images in the elementary grades and found that there was a "significant degree of difficulty in interpreting this imagery." A follow up investigation found that "the grade three children in this project were able to interpret selected elements of band 5 black and white Landsat imagery."[12]

In a subsequent study he investigated the use of bands 4, 5, 6 and 7 with grade six students. (It should be noted that these bands correspond with bands 1, 2, 3 and 4 in Landsat 4 imagery). The results of this exploratory study with a group rated lower than average indicated that the students could deal with multispectral images.[13]

Smith[14] successfully taught academically talented grade six

[10] Steven K. Marks. Correspondence, January 4/January 21, 1983.

[11] Joseph M. Kirman. "Use of Bands Black and White Landsat Satellite Images in the Elementary Grades." Journal of Geography, 1981, 80, 224-228.

[12] Joseph M. Kirman. "Band 5 Black and White Landsat Images: A Definitive Finding for Grade Three and Upper Elementary Levels." Second Interim Report to the Alberta Advisory Committee for Educational Studies. (March, 1981).

[13] Joseph M. Kirman. "An Exploratory Study of Landsat Multispectral Use by Grade Six Children." A Report to the Alberta Advisory Commitee for Educational Studies. (March 23, 1982).

[14] Grant E. Smith. "Remote Sensing and Academically-talented Grade Six Students." Unpublished master's thesis, University of Alberta, Edmonton. (1982).

students to use Landsat imagery in social studies and science. This study was closely related to the Mt. Saint Helen volcanic activity.

In 1978, at the Conference of Remote Sensing Educators (CORSE) Ulliman[15] states: "As far as is known there are no uses of CAI in remote sensing education." Later, however, he accepts its use in the manipulation of large amounts of data.[16]

By the time of the 1981 CORSE there were computer-assisted programs in Silver Springs, Maryland, and at the University of Oklahoma at Norman. Most of these programs were in faculties other than education and at undergraduate or graduate levels.[17]

The University of Oklahoma has successfully downloaded Landsat digital data from a mainframe computer to an APPLE microcomputer. This program allows the operator ~~of~~ the microcomptuer to assign color to the digital data. This opens up vast vistas of educational application in the near future by permitting students to color code the desired targets themselves, rather than by relying on Color 1 images.

MICROCOMPUTER COMPUTER-ASSISTED INSTRUCTION

The first of the turn key stand alone microcomputers, the PET

---

[15] J.J. Ulliman, The Use of Multimedia and Programmed Teaching Machines for Remote Sensing Education. The 1978 Conference on Remote Sensing Education. (Stanford University, Palo Alta, California). 211-262.

[16] Ibid.

[17] Corse 81. The 1981 Conference on Remote Sensing Education. NASA Conference Publication 2197. (Purdue University, West Lafayette, Indiana. Compiled by Shirley M. Davis). 237-297.

2001, appeared in 1977.[18] Its success led to the proliferation of brands of microcomputers. Speed and power of these machines continue to increase while physical size and cost decrease. Silver and Silver[19] note that "One major problem is the standardization in the BASIC language." This prevents the interchange of good software between different makes of microcomputers, and often between different models of the same manufacturer. Despite this problem, Hallworth and Brebner[20] state: "A microcomptuer, such as PET or APPLE, is therefore capable of delivering quite effective CAI programs to one user."

If students merely play prepackaged skill reinforcement software, the computer is underutilized. Computers can help students learn many things providing "the attempt is to simulate a very personal, and individually tailored, conversation between the 'expert' teacher and a widely varying student."[21]

The CAI is a very powerful teaching resource, providing the program is well designed. Bracey[22] feels that "In general, students learn more, retain more, or learn the same faster by using computers."

---

[18] H.J. Hallworth and Ann Brebner. Computer Assisted Instruction in Schools. Executive Summary, Alberta Education. (Edmonton, 1980). 3.

[19] Gerald A. Silver and Joan E. Silver. Simplified Basic Programming. (New York: McGraw-Hill Book Company, 1972). Preface, 2.

[20] H.J. Hallworth and Ann Brebner. Computer Assisted Instruction in Schools. Executive Summary, Alberta Education. (Edmonton, 1980). Preface, 3.

[21] J. Richard Dennis. "Tutorial Instruction on a Computer." The Illinois Series on the Application of Computers, No. 6e. (Urbana, Ill., University of Illinois, 1979). 3.

[22] Gerald W. Bracey. "Computers in Education. What the Research Shows." Electronic Learning, II. (Nov/Dec. 1982). 52.

Microcomputer activity should allow for student interaction with the microcomputer. Sawada[23] says: "This interaction and reciprocal combination of man and computer, unique to education . . . places the computer in a rather unique relationship with man."

Armstrong developed a mainframe computer based CAI program to successfully instruct pre-service teachers in the use of Landsat imagery. The program contained advanced concepts in the areas of electro-magnetic reflectance characteristics. It also presupposed knowledge of many of the basic concepts of the spectrum and electronic data acquisition and transmission. The use of the mainframe computer permitted a number of variations in obtaining student responses during the course of the CAI.[24]

Other than the above, most of the CAI programs relate to mathematical activities or language drills. Even those on social studies deal with histograms, budgeting and statistics.

---

[23] Daiyo Sawada. "The Micros are here: What now?" Elements, XIV. (October 1982). 1-4.

[24] Lee G. Armstrong. A Computer-assisted Landsat Instruction for Social Studies Educators. Unpublished master's thesis, University of Alberta, Edmonton. (1980). 43.

CHAPTER III

THE EXPERIMENTAL DESIGN

1. Introduction

This study was to determine if students could develop the skill to recognize and interpret cultural, geographical and hydrological features on a Landsat Color 1 image with the aid of a computer-assisted instruction program. This chapter describes the selection of the sample, the instruments used and the procedures followed in the collection of data.

2. Sampling Procedure

The sample for this study was selected from the grade six population attending one school in the Edmonton Catholic School System.

The selection of grade six students was predicated on two factors. One, they had completed a science unit that explored the electromagnetic spectrum and some of its absorbption and reflection characteristics. Secondly, some grade six classes had previously successfully completed units on Landsat imagery taught by teachers in a normal classroom setting.

The selection of the pupils for this study was made by the school involved. A random incidental sample was taken from the total grade six population of the school.

Since color discrimination would play a key role in target recognition, only students who were considered normal after being administered a color differentiation test by the school nurse were considered suitable for the sample population.

Students who did not have an observed average classroom behavior were also eliminated. It was felt that students with behavioral problems would jeopardize not only their own performance but also that of the other students in the same group.

Finally, the students to make up the test population had to fall within the average range for grade six students in two further areas. One, they had to be in the average IQ range. Two, they had to have achieved marks within the average range in both vocabulary and comprehension in their latest standardized reading test.

From all the students who met these four criteria, sixteen were selected for the sample, seven boys and nine girls. This number was decided upon because of limited computer availability and time restrictions..

3. Research Questions

The following research questions were posed for this exploratory study:

(a) Could a microcomputer based computer-assisted program be devised to teach grade six students the skills of interpreting Landsat Color 1 satellite images?

(b) Could grade six students derive information from Color 1 Landsat imagery after using a computer-assisted Landsat instruction program?

(c) What were the students' attitudes toward Landsat Color 1 CAI?

4. Design and Development of the CAI Program

This section is devoted to the development of a microcomputer based Landsat imagery interpretation computer-assisted instruction program. There were no programs in existence for either this student level of instruction or for the microcomputer to be used. Therefore, the writer undertook to author such a program.

(A) CAI Program Design

The microcomputer chosen for the design of this program was the Commodore PET 2001 with a 16k memory. This machine was selected because of the preponderance of this type of machine in the Catholic School System. Another factor influencing the decision was the fact that the program would run on all other models manufactured by the same company, including their latest color model, the VIC-64, with minimal program adjustments.

The computer language used in the writing of this program was BASIC. This is an acronym for Beginners All-purpose Symbolic Instruction Code. There are a number of levels of BASIC, as well as a number of variations making it very difficult to use one manufacturer's product on another machine.

The Illinois Series on Educational Applications of Computers provided this writer with an excellent foundation on which to design the Landsat CAI. After the perusal of these books the format of the CAI was decided on.

The CAI program would emerge as a four-part interactive tutorial program. This researcher tried to achieve the type of program visualized by J. Richard Dennis, who said "with properly designed computer programs, a computer system can create personal conversations between the author-teacher and each of the students who uses these materials."[1]

With this goal in mind, this writer went through the following steps in creating the Landsat computer-assisted instruction program used in this research.

i) The objectives were set up for the total CAI program.

ii) The CAI program was divided into four units, each designed to last approximately thirty to thirty-five minutes.

iii) Material was gathered and organized for each unit.

iv) Each unit was written in BASIC and entered into the computer's memory.

v) The program was debugged.

It was then decided that the units and the computer-assisted instruction program were ready for use with the experimental group.

---

[1] J. Richard Dennis. The Illinois Series on Educational Application of Computers, No. 4C. "The Question Episode . . . Building Block of Teaching with a Computer." (College of Education, Department of Secondary Education, University of Illinois, Urban, Illinois. 1979). p. 2.

(B) Content of the Remote Sensing Landsat CAI Program

Material for inclusion in the CAI program was obtained from many sources. The Alberta Remote Sensing Center in Edmonton was particularly helpful in supplying information, that had not yet been published, on Landsat 4.

The course was broken down into four units of approximately thirty to thirty-five minutes duration each. Each of these four units was divided into topic areas. The following describes the units and the subtopics of the Remote Sensing Landsat computer-assisted instruction program.

Unit 1. Remote Sensing

(a) What it is, how it can be stored and retrieved.
(b) The electromagnetic spectrum.
(c) Optional review of the above.
(d) Electronic remote sensing, storage and reproduction of materials obtained this way.
(e) Review option.
(f) Unit quiz, total of fifteen questions.

Unit 2. Landsat Satellites

(a) Landsat satellites of both series and their component parts.
(b) How Landsat satellites operate.
(c) Optional review.
(d) Acquisition of digital data and transmission to ground stations.
(e) Spectral bands and how they are sensed.

(f) Use of digital data to make photographic images - negatives, black and white, Color 1.

(g) Review and quiz of ten questions.

Unit 3. Winnipeg - Remote Sensing

(a) Summer Image:

  i) Identification of hydrological features: clear water and turgid water.
  ii) Identification of geographical targets: vegetation, forests, marsh, farms, bare soil.
  iii) Identification of cultural features: cities, roads and railroads.
  iv) Optional review.

(b) Winter Image:

  i) Identification of hydrological features: snow, ice, clear water.
  ii) Identification of geographical features: coniferous forests, city park, prehistoric lake bed.
  iii) Identification of cultural features: cities, roads and railroads.
  iv) Review.
  v) Quiz of ten questions.

Unit 4. Final Review

(a) Interactive reinforcement review of all segments of the remote sensing CAI program.

(b) Final quiz of fifteen questions.

(C) Debugging the Program

This was done by student volunteers from schools other than those in which the pilot study and the main research were to be carried out. It was further run, unit by unit, by volunteer graduate and post-graduate students. The author acted upon suggestions from the latter group and made corrections to the unit of the program.

Following this, the program was taken to a school and piloted by a single student who had no computer experience. This student's performance fell within the time parameters set out by the researcher.

The program was now considered to be ready for use with the experimental group.

(D) Materials for the Students' Curriculum Kit

Materials were gathered from many individual sources and a Curriculum Kit was produced for use by the students in conjunction with the CAI program.

Each kit contained the following materials:

i) A booklet of meanings for terms used in the CAI program.

ii) Diagrams of Landsat 3 and Landsat 4, with data about the satellites printed on them.

iii) A Winnipeg composite false color image, August 26th, 1976, path 33, row 25.

iv) A Winnipeg composite false color image, December 6th, 1975, path 33, row 25.

v) A standard road map of the Winnipeg area.

vi) A transparent grid that matched the image outline and was used for target location.

vii) An eight-power magnifying glass which was provided by the co-operating school. (See Appendix F for items i-v).

5. Test Instruments

There was a total of four instruments used in the feasibility study.

The pre-test and an achievement test were developed with the co-operation of the Alberta Remote Sensing Center in Edmonton. A "Likert-type" attitudinal questionnaire and a student's written comment sheet were prepared by this researcher.

The pre-test and achievement test are subject to the following limitations:

1. No previous comparable studies have been found using Landsat imagery with grade six students.
2. This study is concerned with the visual recognition of colors on the Landsat imagery, and the relationship of these cues to target knowlege and interpretative skills.

(A) The Pre-Test

The week prior to the commencement of the CAI program a thirteen-question pre-test was administered to the participating students. An infrared false color map of the Kindersley, Saskatchewan, and surrounding area was used with the survey questionnaire. A sample of the pre-test and the corresponding answer key are included in Appendix A.

(B) The Achievement Test

A twenty-question achievement test, based on the content of the

CAI program, was prepared by the writer and administered by him individually to the students in the experimental group the week following the completion of the Landsat CAI program. The students were requested to refrain from discussing the test until testing was completed. The Color 1 Landsat images from Kirman's[2] "Primer for Satellite Maps" was used. They were of the Lethbridge area and the Buffalo-Niagara-Toronto area.

A sample of the achievement test and the associated answer key is shown in Appendix C.

(C) The Attitudinal Questionnaire

To measure the student's attitudes toward the Remote Sensing CAI program, a fourteen-point quetionnaire was developed. The students were required to answer the questions on a seven-point scale of agreement or disagreement. A questionnaire of this type is often referred to as a "Likert-type" scale.[3] The items are scored from a single point for 'strongly disagree' to seven points for 'strongly agree'.

Borg and Gall[4] warn the majority of attitude scales which are direct self-reporting measures are subject to the following limitations:

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[2] Joseph M. Kirman. Primer for Satellite Maps. (Edmonton: Puckrin's Production House, 1978). C1 and C2.

[3] Claire Sellitz, Marie Jahoda, Morton Deutsch and Stuart W. Cook. Research Methods in Social Relations. An Introduction. (New York: Holt Rinehart and Winston, 1966). 339.

[4] Walter R. Borg and Meredith D. Gall. Educational Research. An Introduction, 2nd Ed. (New York: Longman Inc., 1979). p. 210.

(a) We can never be sure of the degree to which the subject's responses reflect his true attitudes.

(b) An individual may not really know how he feels about an issue or situation.

(c) He may never have given the idea serious consideration.

(d) An individual may conceal his real attitude, and express socially acceptable opinions.

Any results derived from the use of a "Likert-type" of attitudinal scale should, in the light of the above limitations, be interpreted with caution. A sample of the Landsat CAI program attitudinal questionnaire is included in Appendix D.

(D) The Written Comment Sheet

In conjunction with the attitudinal quesionnaire the students were given a four-question comment sheet. This comment sheet solicited students' answers to four open-ended questions relating to their opinions of the Landsat CAI. This provided another measure of the opinions of the students to the computer-assisted instruction as a form of teaching. Appendix E contains a sample of the written comment sheet.

6. Pilot Study

A pilot study for the purpose of testing the materials used in this project was conducted in an Edmonton Catholic School approximately two weeks prior to the final collection of data.

A student, whom the teacher judged as average, was selected for the pilot study.

The main reasons for giving the pilot study were:

(a) to assess the time each unit presentation would take;

(b) to observe any difficulties the student might experience at the computer;

(c) to test the feasibility of the achievement test.

Two problems were observed during the pilot study. While not critical during the tutorial section of the CAI program, they were important during the quizzes. Due to the lack of experience, the student took longer to type in single or multiple word answers and so exceeded the time allowed for in the design of the program; but, more important, some right answers were scored wrong by the comptuer due to a letter being repeated while the subject was searching for the next letter to type in.

7. Collection of Data

(A) The Pre-Test

The pre-test was administered to the test subjects as a group. The hard-copy of the Landsat image of the Kindersley area of Saskatchewan was displayed on the bulletin board under an acetate overlay on which there was a numbered grid. The students were given the answer sheets and each question was read aloud by the researcher before they were permitted to write down an answer; further, any target grid that was called for was outlined, with a pointer, by the writer. This was done to eliminate, as far as possible, any confusion that may have developed when the students had to look up from their papers to the image.

(B) The Remote Sensing Comptuer-Assisted Program

The CAI program was administered to groups of four students at a time. This was necessitated by the number of computers available and the size of the room. The groups rotated their time period every day, so that group one used period one the first day, period two the second day, the third period on the third day and was last on the fourth day. The CAI program was started on the Monday and was to have ended on the fourth day but the school had a 'Science Fair' on the Thursday and several of the test subjects were participants in the event. It was therefore decided to postpone the fourth unit for one day.

(C) Records

A log book was maintained by the researcher to record students' comments, behavior, length of time needed to complete each unit and their scores on the quizzes.

(D) The Achievement Test

The Achievement test was individually administered the following week. The test image was covered with a fixed grid-marked acetate sheet. This was overlaid with a clear acetate sheet on which the students wrote their names and the number one. They were given the sheet of questions but refrained from any action until the researcher had finished reading the question out aloud. From time to time the subjects were asked to justify their choice of a target and a note was made of their answers. When the second image was required, the student's acetate sheet was turned over and numbered two. This prevented accidental erasures of the answers from the first image and provided a clean surface for target identification on the second image. The rest of the procedure was the same as for image one.

(E) The Attitudinal Questionnaire

The attitudinal questionnaire and the student's comment sheet were presented to the participating students as a group the day following the completion of the achievement test. All the students responded to most questions with the exception of one student who left on family affairs for an extended period of time.

SUMMARY

In this chapter the selection of the sample, design of the Landsat CAI program, test instruments and the collection of data were described.

The findings of the study are presented in the following chapter.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

1. The Pre-Test

The sixteen participating students completed a thirteen item pre-test presented to them the week prior to the initiation of the Landsat CAI.

In response to the questions on the pre-test directly relating to prior Landsat experience, only one student felt that he had some knowledge of Landsat imagery but his performance indicated that his claim was incorrect. All the other members of the group felt that they had little or no knowlege of interpreting Landsat imagery. Students answering water or lake instead of clear or sedimented water received credit for the answer although it was only partially correct.

The results of the pre-test indicated that the students were unable to locate cultural and geographical features on the image. However, they did appear to associate the color blue with water, possibly because of the use of blue to represent water in the atlas. They were unable to distinguish the clear deep water which appears as black on the image.

The results of this section are summarized in Appendix A, Table 1.

2. The Landsat CAI

This program consisted of four units and a final quiz. All the students completed the CAI within the period of one school week.

The following data was recorded for each student:

(a) The use of the optional review segments.

(b) The time required to complete each unit.

(c) The scores achieved on the quiz for each unit.

(a) There were two optional reviews in the first unit. This was in the event that some students may have covered similar material in the science unit dealing with light. All of the students exercised their option for the first review, but only three did so for the second.

Based on notations of the student's comments in the log book it would appear that the option in Unit 1 was exercised to discover the contents of a 'review'.

Unit three had an optional review after the training session on the summer image. Thirteen students exercised their option for this review. The introduction of the false color infrared image in unit three presented many new concepts which, according to the log, the students wanted to review. See Appendix B, Table II.

(b) The time required to complete each unit varied from student to student, as well as from unit to unit. The mean time for all the students to complete a unit of the program was 34.75 minutes. The individual times are recorded in Appendix B, Table III.

(c) The average time to complete all four units of the CAI was 139 minutes. The range of time to complete the program was 108 to 197 minutes.

(d) The scores achieved by the students on the unit quizzes varied from unit to unit. The students who exercised the review options usually fared better than those who did not. The mean total of the scores was 65.96%. The individual results are recorded in detail in Appendix B, Table II.

On Table IV - the stargraph - the students' achievements are presented in a graphic mode. The same student retains the same number for all four stargraphs. See Appendix B.

3. The Achievement Test

The week following the completion of the CAI, a twenty question achievement test was administered to the students. The testing was done on a one-to-one basis to enable the students to justify their answer if requested by the researcher. The overall scores for the Achivement Test are recorded in Appendix C, Table 5.

The test was divided into three areas:

(a) Specifically taught imagery
(b) Applied interpretation
(c) Landsat technology

(a) Specifically taught imagery

This consisted of twelve questions based on the cultural, geographical and hydrological features. These targets were taught, using the training Landsat images during the CAI. These questions were numbers 1, 3, 4, 5, 6, 7, 8, 9, 10, 14, 18 and 19.

(b) Applied interpretation

There were three questions in this section. They were for targets that had not been taught during the training sessions. They required application of knowledge of facts acquired from the CAI to define a new target. The students had to take the hydrological signature of water, add to it the cultural feature of a straight line, and find the canal which was in the same general area as a river.

The students had been trained on snow in the winter image. On the test they had to identify two areas of different types of clouds. Clouds and snow have similar spectral signatures. These questions were numbers 2, 12 and 13.

(c) Landsat technology

There were a total of five questions in this area. One dealt with the scale of the image. Another related to the date of image acquisition by Landsat. Three referred to the sensing capabilities of three of the four bands sensed by the Landsat. It would appear that the students had some difficulty with the question dealing with the characteristics of the bands. These questions were numbers 11, 15, 16, 17 and 20.

4. Landsat CAI Attitudinal Questionnaire

The attitudinal questionnaire employed in this study consisted of fourteen items designed to evaluate the attitude of the students toward the Landsat CAI program. Students responded to each item on a scale of seven levels. Individual items were given numerical ratings from one, strongly disagree, to seven, strongly agree.

In most studies where an attitudinal questionnaire is employed, the results should be interpreted with caution and, where possible, supported by other measures. The students' scores on the "Likert-type" questionnaire were tabulated and the following data was obtained:

Question 1 = $\overline{X}$ = 6.2

Question 2 = $\overline{X}$ = 6.37

Question 3 = $\overline{X}$ = 4.83

Question 4 = $\overline{X}$ = 4.55

Question 5 = $\overline{X}$ = 5.53

Question 6 = $\overline{X}$ = 5.33

Question 7 = $\overline{X}$ = 4.2

Question 8 = $\overline{X}$ = 2.8

Question 9 = $\overline{X}$ = 6.67

Question 10 = $\overline{X}$ = 6.33

Question 11 = $\overline{X}$ = 4.2

Question 12 = $\overline{X}$ = 5.27

Question 13 = $\overline{X}$ = 6.53

Question 14 = $\overline{X}$ = 6

Note: Questions 4, 5, 7, 8 and 11 were used to elicit additional information regarding the CAI from the students.

5. Students' Written Comment Sheet

The students were given an oportunity to express, in writing, their comments regarding their experience with the Landsat CAI program. Only fifteen responded as one student had left the school for an extended period. The following four questions were presented to the class.

i) What is your opinion of the Landsat CAI program?

ii) What problems, if any, did you experience while taking the program?

iii) How might the CAI program be improved?

iv) Would you prefer, as a student of social studies, to learn about Landsat satellite interpretation by the traditional teacher method or by computer-assisted instruction? Give reasons for your answer.

Question 1. What is your opinion of the Landsat CAI program?

The fifteen students responded positively to the CAI program. Their answers are contained in Appendix E, Table VI.

Question 2. What problems, if any, did you experience while taking the program?

Nine of the students indicated that they had experienced some difficulties while taking the program; four students did not experience any problems and two students did not respond to this question. The students' answers are in Appendix E, Table VII.

Question 3. How might the CAI program be improved?

Ten students offered suggestions as to how the CAI program might be improved. The students' answers, given in their own words, are recorded in Appendix E, Table VIII.

Question 4. Would you prefer, as a student of social studies, to learn about Landsat satellite image interpretation by the traditional teacher method or by computer-assisted instruction?

Ten students indicated that they would prefer to be taught by computer-assisted instruction, and two preferred the traditional method. One liked both methods of instruction, while two were not sure of which method they preferred. The students' responses to this question are recorded in Appendix E, Table IX.

DISCUSSION OF RESULTS

1. The Pre-Test

The mean score of 1.133 suggests that all students in the experimental group had little prior knowledge of Landsat imagery interpretation. The student who indicated some prior knowledge of Landsat imagery interpretation did not achieve a score significantly different from the other students, either in the pre-test or in the subsequent achievement test. It would appear that the little prior knowledge claimed by this student did not affect his performance.

It should be noted that all members of the sample group expressed the view that they had very little knowledge of Landsat imagery interpretation at the time when the pre-test was administered.

2. The Landsat CAI Program

The average time required to complete the entire CAI program was 139 minutes, and the range was from 108 to 197 minutes. The range of time required to complete the CAI program demonstrates its capacity to allow for individual differences in the knowledge acquisition pace of the students.

Over the four programs the marks range from a low of 30% in Unit 2 to a high of 100% in Unit 3. There was a total of nine scores below the 50% mark on all four units. There appeared to be no correlation between time and scores.

The collection of data on each student's performance is an important characteristic of a CAI program; however, the interaction between the student and the computer is equally important.

The students were, at first, apprehensive about making any attempt at answering a question on the computer unless they believed it to be correct, and would sit idle for a few minutes until they were persuaded to attempt an answer. Once they discovered that the computer would accept a range of answers, or guide them towards an acceptable answer, they relaxed. After this point was reached, it was not unusual to have a student talk to the computer. The students were further involved with the program by being addressed by name from time to time.

The little figure of a man, who often provided positive or negative feedback, invoked the following comment from one of the students: "Oh, he doesn't like me anymore; he's frowning at me!" When he got the next answer correct and the smiling figure returned to the screen he commented: "I'm glad he's not mad with me anymore!" In the unit dealing with the winter training image, the figure requested time to dress while the computer was loading the appropriate section. When he appeared fully clad for winter activity outdoors, one of the students broke down into giggles and kept repeating: "He's cute!". Another student turned to the researcher and said: "Mr. Burke, I _like_ him!"

All of the students made positive comments on the feedback they received, except for when they made a typographical error and received negative feedback. This involved comments such as: "You stupid machine, you knew what I meant!" or "That was right, but I spelt it wrong!", or even "That's not what I meant to say!". Very rarely did the student turn to the researcher for arbitration; rather he argued with the computer, seemingly unaware of the other people in the room until the final mark for the unit was displayed on the screen. Then the students announced the results to each other if they were good, and ignored poor marks.

After the program had been piloted the unit quizzes were modified so that the students would need only a single key response to a question because of the student's difficulty in typing and general unfamiliarity with the location of the keys on the keyboard.

Analysis of the questions revealed that the students encountered some difficulty with negatively worded questions, as well as with multiple choice questions which contained the choices of "All of the above" and "None of the above". This was probably due to their unfamiliarity with questions of this nature.

In general, the results indicate that a large portion of the questions concerning course material were answered correctly during the CAI units and quizzes.

The branching features of the program were used only twice by the student during the piloting of the program. Therefore some of the reviews were converted from optional to mandatory because of their contents.

Student suggestions regarding improvement to the Landsat CAI program will be dealt with later in this chapter.

3. The Achievement Test

Results of the achievement test indicate that grade six students can be taught to interpret and derive knowledge from Landsat imagery of an area with the aid of computer-assisted instruction. The average of 80.6% on the achievement test indicates, to some extent, the effectiveness of the Landsat CAI program in training the students to identify selected Landsat targets.

The majority of the questions that required interpretation of a target area were well answered. The area of weakness, where the students had some difficulty, was the characteristic of wave length bands.

Questions 15, 16 and 17, dealing with the characteristics of Bands 1, 3 and 4 caused the students some problems. The characteristics of Bands 1, 2, 3 and 4, had been explained in the CAI program and the students had been examined on this concept shortly after its presentation. The response analysis for these questions in the post test suggests that though the students were aware of the individual characteristics of each of the bands, they may have got them confused. The time lapse between the presentation of this material, and the writing of the post test may have affected the students' ability to recall the details associated with a particular band number.

Questions 3, 4, 6 and 12 required the students to interpret the color of targets and identify what they were likely to be. Most students had little trouble with this task.

Cultural features were targeted in questions 4, 6, 8, 10, 13 and 18, and were easily recognized by most students. Similarly, the geographical features in questions 1, 2, 5 and 9 appeared to present little difficulty to the students.

The hydrological targets in questions 3, 7, 13 and 14 presented the students with little difficulty.

The technical questions of time of acquisition of the image were answered correctly by all the students. Question 20, which required the students to give the scale of the Landsat image was correctly identified by 75% of the students.

4. The Landsat CAI Attitudinal Questionnaire

Earlier in this thesis the author alluded to some of the limitations associated with the use of attitudinal questionnaires. In order to cross-check the information obtained by this questionnaire, the students in the experimental group were asked to respond to four open-ended questions on a written comment sheet. The researcher used these results to cross-check those obtained on the "Likert type" attitudinal questionnaire.

The results of the survey clearly indicate that the students had a favorable attitude toward the program. On an average, 85% of the students rated it four or better on the Likert scale - ranging from one - strongly disagree - to seven - strongly agree. On an average, 70% of the students rated their evaluation as five or above on the same scale.

The items which received the highest ratings in the attitudinal questionnaire indicated that the students liked taking the Landsat course by computer-assisted instruction and would like to participate in other courses by the same means. The majority of the students felt that the course had been helpful to them in learning the material and that they would recommend the Landsat CAI to other students. Some students expressed the need for more instruction in the subject area; most felt that the course was reasonably easy to understand and provided a good basic knowledge in interpreting Landsat imagery.

5. Student's Written Comment Sheet

The students' responses to the questions were cross-checked by the author to ascertain that their written comments and previously expressed attitudes were similar. It may be stated that there was a high degree of agreement between the written responses and those made on the "Likert-type" attitudinal test responded to earlier by the students.

The responses to question one indicate that the students were enthusiastic about the program. This may have been due to extra computer time that the students were being given or because this was not a skill reinforcement game that they were using. The interactive nature of the program called for total student involvement and, from observations made during the sessions, this was achieved.

Responses by the students to question two were brief and do not present an accurate picture of problems that they encountered but did not recall at the time of writing their comments.

The written comments focus on two main areas of concern: the unfamiliarity of the Landsat terminology and the difficulty of detecting student typographical errors before entering them into the computer.

There were more subtle difficulties that were observed by the researcher even though many of them disappeared by the completion of the CAI program.

The students were generally nervous about beginning the program when the computer required an input that they were not certain of. Once the instructive nature of the program was discovered, the majority of the students enjoyed the program and one even wanted to repeat the whole unit.

The majority of the students felt the need for someone competent in the program to be in the room at all times to answer questions. There were few questions posed in the computer room dealing with the

CAI program. Most of the questions raised during the CAI program were regarding the operation of the terminal rather than difficulties with the program. It must be noted that there were a number of questions concerning how this researcher created some of the graphic displays and other programming features, such as recalling the students' names.

The students' responses to question three were very helpful and all but two pupils responded. Their suggestions may be categorized into the following areas: more programs, more challenging programs, easier programs, more photographs, more information in the student's package, and access by all students to the Landsat CAI program.

Question number four did not cause any surprises. Most of the students favored the CAI program. A few of them felt they would like a combination of traditional teaching and a computer-assisted program. The concerns expressed by the students reflected the wider concern of society about students being prepared for the computerized future. Many enjoyed the interactive program which reduced tension during the learning process. Most of the students felt more relaxed learning from the computer because of the confidential nature of their work, i.e. their errors were kept private.

In summary, the results of the achievement test indicated that grade six students can understand and obtain information from Landsat images with the aid of a computer-assisted program. The students indicated that they found the course material interesting and well presented. They felt that they had benefitted from the program and would recommend it to other students. Further, the majority indicated that they preferred learning Landsat image interpretation by a computer-assisted instruction program to the traditional classroom method.

These facts were revealed in the students' attitudinal questionnaire. Specific student suggestions to improve the CAI program, obtained from their written comments, have been incorporated into the Landsat CAI program where feasible.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The results of this research indicate the feasibility of a microcomputer being used for an interactive CAI program to teach about Landsat Color 1 imagery.

Further, the results indicate that Grade six students were able to understand and derive information from Landsat Color 1 images with the aid of a computer-assisted program.

The study also discovered that the students developed a very favorable attitude toward this Landsat CAI. Therefore, another conclusion that may be reached is that this computer-assisted program, with its Canadian content, may be a beneficial addition to the grade six social studies curriculum.

The investigation also demonstrated that a computer-assisted program can serve as a vehicle for presentation of Landsat imagery interpretation material. This would appear to suggest that other programs could be developed that would have particular significance to social studies. The quality of the CAI programs may be continually upgraded by the addition of the most recently released materials on Landsat and its imagery.

Recommendations for Further Research

Based on the results of this exploratory study, it may be recommended that more research on interactive computer-assisted programs in the social studies be undertaken. Some suggested research problems for futher investigation are:

1. Would higher test scores be achieved if there were more than one student at each microcomputer station?
2. Can students at a lower grade level be taught Landsat image interpretation from a CAI program similar to this?
3. Could students learn Landsat image interpretation as well as in this study if the CAI program were presented by the teacher to the whole class with the aid of TV monitors?
4. Could a series of CAI programs be developed to teach more advanced image interpretation for the upper elementary grades?
5. Would using the same CAI program on more than one make of microcomputer affect achievement by the students?
6. Is there an optimum computer-assisted instructional techinque for working with Landsat images?
7. Could a CAI program in Landsat image utilization be designed for use by elementary school children incorporating the use of down-loaded Landsat digital data?

In summary, the objective of this study was achieved. An interactive microcomptuer based Landsat computer-assisted program was developed to teach Landsat imagery interpretation to grade six students, and these students were able to comprehend and derive information from Landsat images with the aid of the CAI program.

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APPENDICES

APPENDIX A

THE SURVEY QUESTIONNAIRE WITH ANSWER KEY

THE UNIVERSITY OF ALBERTA

DEPARTMENT OF ELEMENTARY EDUCATION

THE PRE-TEST

Name ______________________________

INSTRUCTIONS

Please fill in the answers to the questions in the space provided.

1. What is it that is being shown to you (be specific)?

____

____

2. How was this image made?

____

____

3. Have you ever worked with this type of image before? Yes __ No __.
If yes, how?

____

____

4. What features do you see in Grid number 13?

____

____

5. What features do you see in Grid number 10?

6. What features do you see in Grid number 16?

7. What does the color red on this image indicate?

8. What is indicated by the small rectangles?

9. What does the black in Grid number 7 indicate?

10. In Grid number 6, what is indicated by the blue?

11. What do you think the normal scale of this image is?

12. Have you ever had any lessons, in class, that have been about what you are looking at? No ___ Yes ___. If yes, tell where and when.

____

____

13. My knowledge about this type of image is:

Very little						Very good
1	2	3	4	5	6	7

THE PRE-TEST ANSWER KEY

Question	Answer
1	Landsat satellite map (Image)
2	Satellite photograph map
3	n/a*
4	City
5	River or stream
6	Vegetation or farms
7	Vegetation
8	Farms or farmland
9	Water or lake
10	Water or lake with sedimentation
11	1 : 1 million
12	n/a
13	n/a

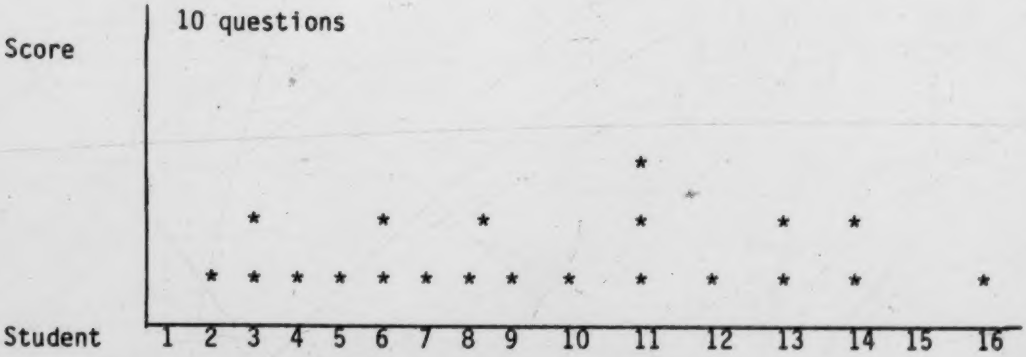
* denotes not applicable

TABLE I

STUDENT PERFORMANCE IN THE PRE-TEST

No.	Task	Correct	Partially Correct	Wrong	Blank
1	Identify Landsat image/map	0	.44	.56	0
2	How was it produced?	.06	.06	.88	0
4	Identify cultural feature	0	0	100	0
5	Identify geographical feature	0	0	100	0
6	Identify vegetation or farms	0	0	100	0
7	Identify color	0	0	100	0
8	Identification of land utilization	0	0	100	0
9	Locate clear water	0	.06	.82	.12
10	Identification of turgid lake	0	.69	.25	.06
11	Scale of image	0	0	.94	.06

Partially correct answers were counted as correct for this survey.



*indicates each correct response. Total possible 10. $\bar{X}$ = 1.31

Q. 3 Prior experience with Landsat imagery Yes = 1 No = 15

Q.12 Lessons on Lansat imagery Yes = 0 No = 16

Q.13	Knowledge of imagery scored on a 1-7 scale:	1	2	3	4	5	6	7
	Number of children	1	7	4	1	-	-	-

Three children did not reply to question 13.

APPENDIX B

USE OF REVIEWS, SCORES AND TIMES FOR EACH UNIT

TABLE II

UNIT SCORES AND STUDENTS USE OF REVIEW OPTIONS

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Unit 1																
Review (a)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Review (b)				*			*				*					
Raw Score	9	6	9	10	9	9	10	7	11	6	14	6	10	10	7	8
Percentage	60	40	60	67	60	60	67	47	73	40	93	40	67	67	47	53
Unit 2																
Review	*	*	*	*		*	*		*		*		*	*		*
Raw Score	6	6	8	8	5	8	6	3	8	5	8	4	5	8	5	9
Percentage	60	60	80	80	50	80	60	30	80	50	80	40	50	80	50	50
Unit 3																
Review	*	*	*	*	*		*	*	*	*	*		*		*	*
Raw Score	7	6	6	10	7	4	9	9	9	8	7	5	7	5	6	9
Percentage	70	60	60	100	70	40	90	90	90	80	70	50	70	50	60	90
Unit 4																
Raw Score	14	12	13	18	9	15	15	13	18	16	16	11	12	14	12	15
Percentage	70	60	60	90	45	75	75	65	90	80	80	55	60	70	60	75

* denotes use of review option

	Range	Average		No. of questions
Unit 1	40-93%	8.81	(58.8%)	15
Unit 2	30-90%	6.38	(63.8%)	10
Unit 3	40-100%	7.13	(71.77%)	10
Unit 4	45-90%	13.94	(69.7%)	20
Total Program	46.3-83.3%	36.26	(65.9%)	

TABLE III

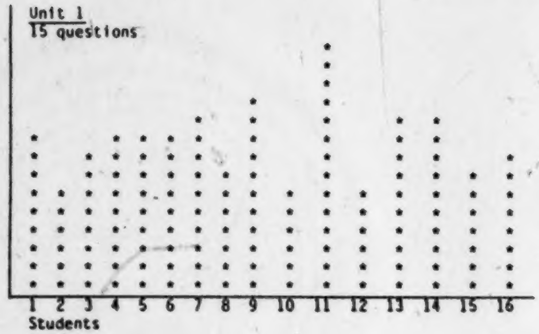
TIME REQUIRED TO COMPLETE EACH UNIT (IN MINUTES)

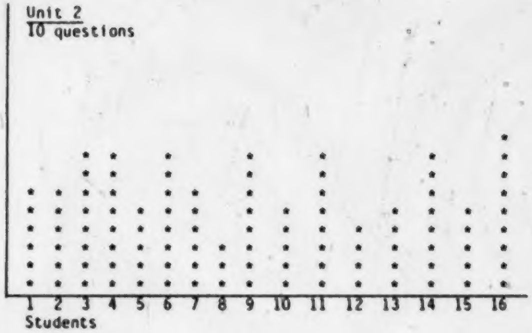
Student	Unit 1	Unit 2	Unit 3	Unit 4	Total
1	30	31	65	30	156
2	27	29	50	25	131
3	32	32	53	25	142
4	24	29	60	20	133
5	29	32	40	30	131
6	35	36	48	30	149
7	25	25	40	18	108
8	28	34	105	30	197
9	30	29	45	19	123
10	28	35	50	24	137
11	25	30	43	20	118
12	33	35	55	28	151
13	29	32	53	30	144
14	28	35	49	20	132
15	27	22	46	23	118
16	31	35	58	30	154

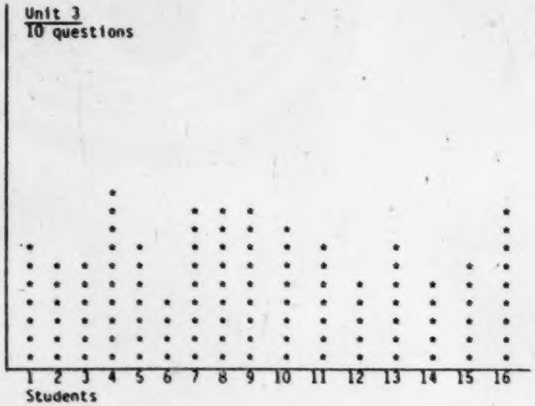
Unit 1	$\bar{X}$ = 28.81	Range 24 to 32
Unit 2	$\bar{X}$ = 31.31	Range 22 to 36
Unit 3	$\bar{X}$ = 53.75	Range 40 to 105
Unit 4	$\bar{X}$ = 25.13	Range 18 to 30
Program	$\bar{X}$ = 139	Range 108 to 197
Per Unit	$\bar{X}$ = 34.75	

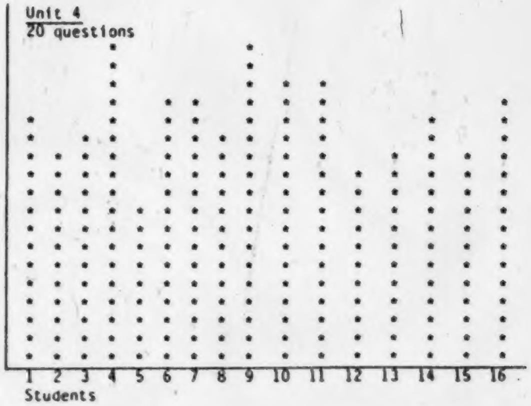
TABLE IV

UNIT SCORES FOR EACH UNIT OF THE LANDSAT CAI PROGRAM









Each * represents one mark.

APPENDIX C

THE ACHIEVEMENT TEST WITH ANSWER KEY

THE UNIVERSITY OF ALBERTA

DEPARTMENT OF ELEMENTARY EDUCATION

LANDSAT CAI PROGRAM

ACHIEVEMENT TEST

Name ____________________

Instructions

Please fill in the answers to the questions in the space provided.

***NOTE** - There will be two Landsat images used during the post-test.

1. What is the most noticeable feature in Grid number 2?

   ____

2. Give the number of the Grid in which there is cloud. Draw a box around the cloud.

   ____

3. What does the blue color in Grid number 7 indicate?

   ____

4. What is shown as red on this image?

   ____

5. Write down the numbers of three Grids in which there is evidence of water. Draw a triangle around each body of water.

____

6. What do the grey rectangles in Grid number 4 indicate?

____

7. In which Grid is there evidence of sedimentation in the water?

____

8. What are the small rectangles in this image?

____

9. In this image the blue lines represent:

   a) rivers
   b) valleys
   c) highways
   d) lakes

10. In Grid number 5, the little criss-cross lines are:

   a) city streets
   b) roads
   c) fences
   d) rivers

***NOTE** - A new image will be introduced at this point.

11. This image was most likely made in:

   a) mid-summer
   b) early fall
   c) mid-winter
   d) late spring

12. What does the area of white in Grid number 1 represent?

____

13. Name a Grid number inside of which there is evidence of a canal. Draw a box around the complete canal.

14. Name the Grid which has the largest area of clear deep water.

15. Band 1 is useful for which of the following:

    a) detecting cultural features
    b) detecting sediment in water
    c) classifying vegetation
    d) all of the above
    e) none of the above

16. Band 4 is useful for all of the following characteristics except:

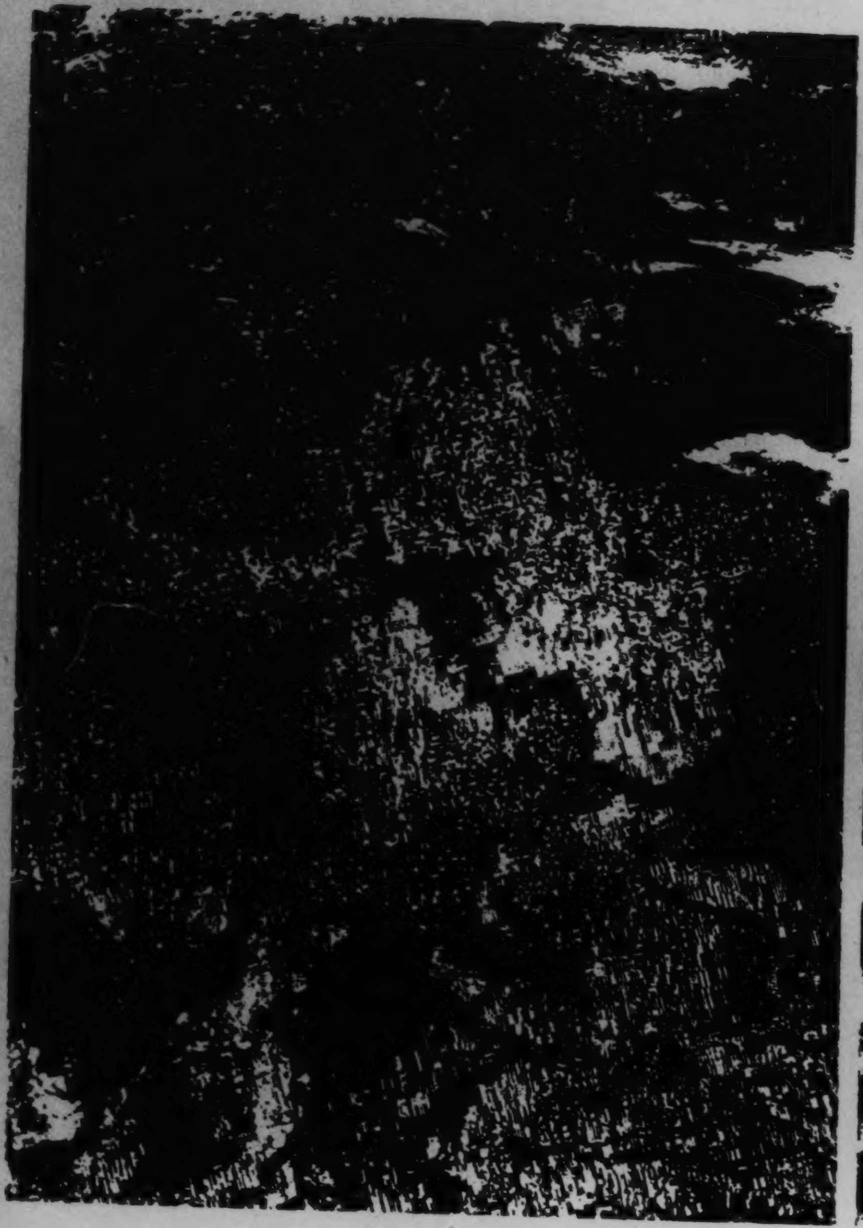
    a) detection of wet soils
    b) detecting insect or disease damage
    c) detecting evergreen and deciduous forest areas
    d) detecting water

17. Band 3 is most useful for its water detection characteristics. (Answer true or false)

18. Name a Grid in which a city is located. Draw a circle around the city.

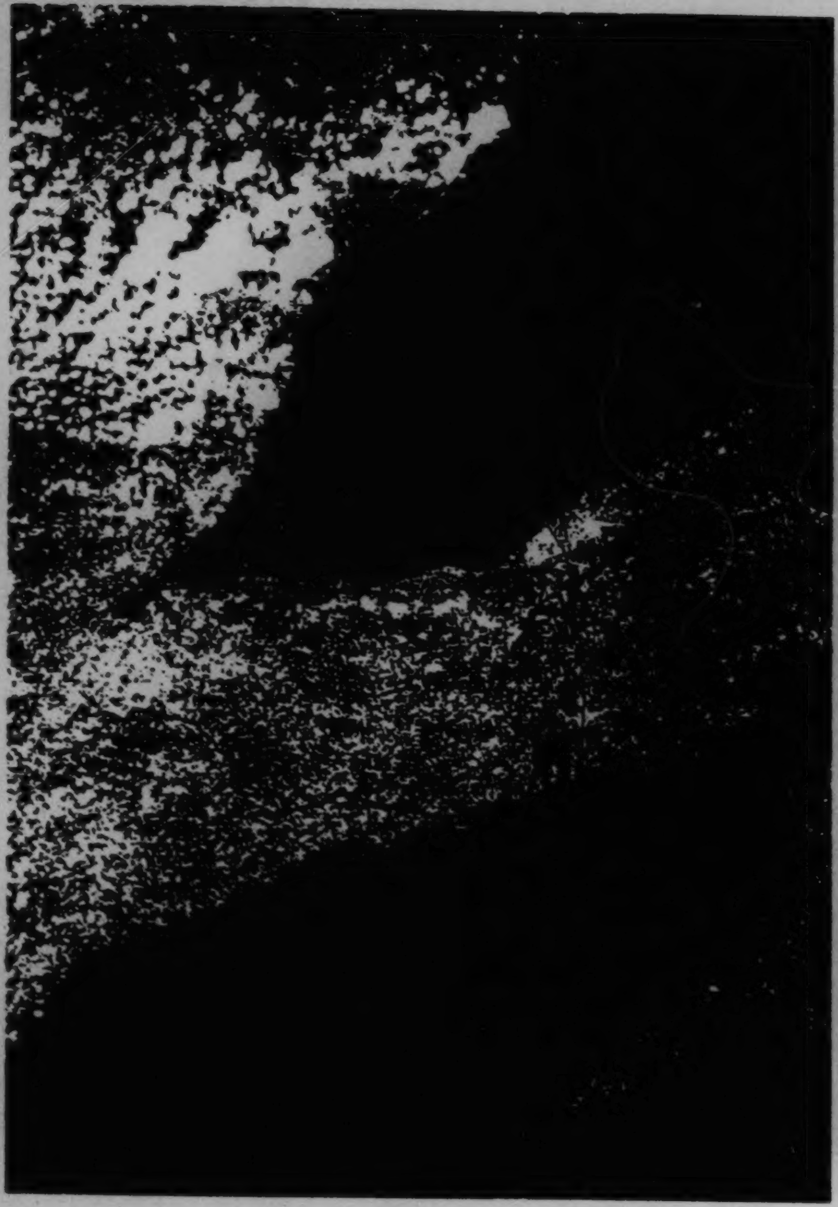
19. Name a Grid in which sedimented water is found. Draw a triangle around the sedimented water.

20. The usual scale of the Landsat image is:



C1 LETHBRIDGE, ALBERTA
September 10, 1973

C2 LAKE LOUISE, BANFF
August 3, 1974



B1 BUFFALO, NIAGARA, TORONTO
September 3, 1973

B2 DETROIT-WINDSOR
June 7, 1973

ACHIEVEMENT TEST ANSWER KEY

Question	Answer
1	Lake
2	2
3	Water with sediment
4	Vegetation or farms
5	1, 2, 4, 5, 7, 8 (any three)
6	harvested fields, fallow fields, bare soil
7	2, 4 or 7.
8	Farms
9	Rivers
10	Roads
11	Early fall
12	Cloud
13	5
14	2
15	All of the above
16	Detecting evergreen and deciduous forest areas
17	False
18	1, 4 or 5
19	4, 5 or 7
20	1 : 1 million

TABLE V

ACHIEVEMENT TEST QUESTION ANALYSIS

Question	% Correct	% Incorrect
1	93.75 (15)*	6.25 (1)
2	93.75 (15)	6.25 (1)
3	75 (12)	25 (4)
4	100 (16)	--
5	100 (16)	--
6	87.5 (14)	12.5 (2)
7	87.5 (14)	12.5 (2)
8	93.75 (15)	6.25 (1)
9	87.5 (14)	12.5 (2)
10	100 (16)	--
11	100 (16)	--
12	62.5 (10)	37.5 (6)
13	68.75 (11)	31.25 (5)
14	93.75 (15)	6.25 (1)
15	43.75 (7)	56.25 (9)
16	25 (4)	75 (12)
17	62.5 (10)	37.5 (6)
18	81.25 (13)	18.75 (3)
19	81.25 (13)	18.75 (3)
20	75 (12)	25 (4)
$\bar{X}$	80.625	19.375

* Number of correct responses.
Total number of students: 16. Total number of questions: 20
Range of correct responses: 10-20

Distribution of scores

20	19	18	17	16	15	14	13	12	11	10	9-1
1	1	-	5	5	1	1	1	-	-	1	Nil

APPENDIX D

LANDSAT CAI PROGRAM ATTITUDINAL QUESTIONNAIRE

LANDSTA CAI PROGRAM ATTITUDINAL QUESTIONNAIRE

1. I found the course was useful in helping me learn the material.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

2. The material in this course was:

Very Boring						Very Interesting
1	2	3	4	5	6	7

3. This material was easy to understand.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

4. What portion of this material had you been taught previously?

None						All
1	2	3	4	5	6	7

5. Someone who knows the subject should be in the microcomputer room.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

6. When the teacher was in the microcomputer room, I felt that he did a good job in answering my questions.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

7. I feel I need more instruction to interpret Landsat images.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

8. It would have been easier to learn this material by classroom instruction.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

9. Taking this course was a good investment of my time.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

10. I would recommend this course to other students.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

11. I would rate the difficulty of this course as being:

Very Easy						Very Difficult
1	2	3	4	5	6	7

12. I have a good basic knowledge of Landsat satellite images now.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

13. I liked taking this course via Computer Assisted Instruction.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

14. I would like to take other courses via Computed Assisted Instruction.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

APPENDIX E

LANDSAT CAI PROGRAM WRITTEN COMMENT SHEET

COMMENT SHEET

1. What is your opinion of the CAI Landsat program?

2. What problems, if any, did you experience while taking the program?

3. How might the CAI program be improved?

4. Would you prefer, as a student of social studies, to learn about Landsat satellite image interpretation by the traditional teacher method or by Computer-assisted Instruction?

   By traditional teacher method __________ By CAI ____________

   Give reasons for your answer.

TABLE VI

STUDENT RESPONSES TO QUESTIONS ON WRITTEN COMMENT SHEET

Question 1. What is your opinion of the CAI Landsat program?

Student	Responses
1.	It is a good project for a computer.
2.	It's fun. I liked it.
3.	CAI thing is fun because I want to know more thing about computers.
4.	I think it is interesting to learn about.
5.	It is good.
6.	I think it is very good to let students to know about Landsat satellite because they will know what is going on.
7.	It was neat.
8.	Very good.
9.	Very interesting.
10.	It is very interesting to learn and you can get a lot of information from the computer.
11.	It was fun.
12.	I like it and I think it is great.
13.	I think it is a good program.
14.	I like it the way it is,
15.	Very interesting.
*16.	(This student was absent).

NOTE. The above answers are verbatim.

TABLE VII

STUDENT RESPONSES TO QUESTIONS ON WRITTEN COMMENT SHEET

Question 2. What problems, if any, did you experience while taking the program?

Student	Responses
1.	None.
2.	None.
3.	The quize.
4.	About Landsat 4.
5.	The colour bands.
6.	Well just one of the chapters we took was hard.
7.	The questions were a little difficult to understand.
8.	-
9.	The quizs.
10.	It was sometimes hard to see your spelling mistakes because sometimes you get nervous.
11.	None.
12.	The part with the map.
13.	None.
14.	Couldn't understand a few questions.
15.	-
*16.	(This student was absent).

NOTE. The above answers are verbatim.

TABLE VIII

STUDENT RESPONSES TO QUESTIONS ON WRITTEN COMMENT SHEET

Question 3. How might the CAI program be improved?

Student	Responses
1.	By making more programs.
2.	More computers make longer harder.
3.	-
4.	By having real photographs of Landsat 4.
5.	More easier.
6.	I think nothing should be improved because I like it how just the whev it is.
7.	I don't know.
8.	None.
9.	If everyone had the course.
10.	-
11.	Computers for everyone.
12.	More notes.
13.	When you are doing the image of winter and summer I think you need a ledgen.
14.	N/A
15.	Learning about the satellites and the Landsat.
*16.	(This student was absent).

NOTE. The above answers are verbatim.

TABLE IX

STUDENT RESPONSES TO QUESTIONS ON WRITTEN COMMENT SHEET

Question 4. Would you prefer, as a student of social studies, to learn about Landsat satellite image interpretation by the traditional teacher method or by Computer Assisted Instruction?

By traditional lecture method ______ By CAI ______

Giver reasons for your answer.

Student	Responses
1.	CAI - so I could learn more about computers. For when I grow up and if we have lots of computers and I could be able to use them properly.
2.	CAI - I will be able to work more with computers. I could get mad at it.
3.	Maybe - it give us information about lots of things about computers.
4.	CAI - because the students will want to learn more, or they will be more excited to learn.
5.	CAI - it is funner to do it with a computer and easier.
6.	CAI - because I found it easier for a computer to teach me.
7.	CAI - because it is fun to learn and I like it.
8.	Both - because you might need to talk to someone about it.
9.	CAI - it gives you more information.
10.	CAI - it is easier by a C.A.A. and I think you can understand (explain) the C.A.A. better than a teacher.
11.	TM - because a teacher gives more details and is easier to understand the program.
12.	CAI - because I think it was interesting and it isn't as boring.
13.	CAI - because if you are taught by your teacher (homeroom) you won't meat any other teachers.
14.	Traditional method - it is less confusing.
15.	Both - not sure.
*16.	(This student was absent).

NOTE. The above answers are verbatim.

APPENDIX F

STUDENTS CURRICULUM KIT

STUDENT NOTES
FOR USE WITH
A LANDSAT COLOR 1 CAI PROGRAM
FOR GRADE SIX STUDENTS

By: B.T. Burke

RESMOTE SENSING CAI

Instructions

1) Remove floppy disk from cover.
2) Place floppy disk in drive 0 with the label side up.
3) Type in D Load "Alpha" and press Return
4) When 'Ready' appears on the screen type in 'Run' and press Return.

The program will now begin. You will be given instructions during the program. Follow the instructions carefully. Don't try to take short cuts.

Definitions

Here are some of the terms that you may need to refer to in the programs. You will also find the satellite drawings for use in this course after the definition.

Band. This is the wavelength of a specific type of radiation. Bands are sometimes numbered in a similar manner to TV channels. They are also called spectral bands.

Color composite image. This is the photographic-like image made by giving different colors to different bands when the negatives of each band are placed exactly over one another to make a print.

Electromagnetic spectrum. The total radiation wavelengths, regions or bands given off by the sun. These range from cosmic rays to radio waves. Only some of these are used in remote sensing; they range from the ultra violet to the radar bands.

Invisible spectrum. This is the part of the electromagnetic spectrum that cannot be detected by the human eye but which can be detected and recorded by electronic devices.

Landsat. This refers to the Landsat satellites in near-polar orbit scanning for electromagnetic radiation or reflectance from the surface of the earth on a recurring path.

Landsat 1-3. These are the first in a series of six satellites launched by the United States. All three are now shut down.

Landsat 4. This is the latest Landsat satellite to be placed in orbit. It was launched on July 16, 1982. This satellite is different in design and in the hardware it contains from the earlier series. (See the diagrams at the end of this section).

Landsat Color 1. A color composite image which is sometimes called a false color infrared image which is made by coloring Band 1 blue, Band 2 green and Band 4 red.

Landsat image. This is an image made by using Landsat satellite data on photographic materials. Sometimes this is called a Landsat map.

Multispectral scanner. (MSS) This is the device on the Landsat that separates the reflected sunlight into each spectral band for recording or transmission as image data.

Near-polar orbit. This is an orbit that takes the satellite near the north and south poles but not over them.

Radiation is the movement of electromagnetic energy through space in the form of waves.

Remote sensing is the science or art of getting information about a 'target' by analysing the reflected electromagnetic energy from the 'target' without having to make contact with it.

Spectral band. This is the location of a specific electromagnetic frequency range.

Stressed vegetation. This is vegetation that is suffering from lack of moisture or is subject to an infestation of insects or disease.

Target. This is the specific area to be analyzed on a Landsat image.

Visible spectrum is that part of the electromagnetic spectrum visible to the human eye and which contains all the colors of the rainbow.

The following are very important and you may want to refer to them even though they are in the program itself.

Characteristics of the Landsat MSS bands.

Band 1. It records the blue-green portion of the visible spectrum. It is useful for detecting cultural features, such as road and towns. It is also useful for detecting geographical features and sediment in water.

Band 2. This records the red part of the visible spectrum. It is most useful for telling the different types of vegetation. It also shows cultural features, such as drainage patterns and roads.

Band 3. It records in the near infrared portion of the spectrum. Band 3 is most useful for its water detection characteristics. As water absorbs infrared radiation, there will be little, if any, reflection from the water so water areas will be shown as black. In addition, the infrared reflectance from vegetation is also recorded. This vegetation reflectance is most useful for detecting evergreen (low reflectance) and deciduous (high reflectance) forest areas. Band 3 also shows tonal contrasts that reflect various land use practices.

Band 4. It records in the moderate/near portion of the spectrum (well beyond the visible range). Band 4 keeps the water detection characteristic but, in addition, also picks up the low reflectance of wet soils, sloughs, marsh and muskeg. By comparing Band 3 to Band 4, open bodies of water may be discriminated from the wet soil conditions. Also, Band 4 provides maximum infrared reflectance from vegetation, which is useful for detecting the extents of blights and insect infestations in crops and forests. Band 4 is best for telling the difference between land and water.

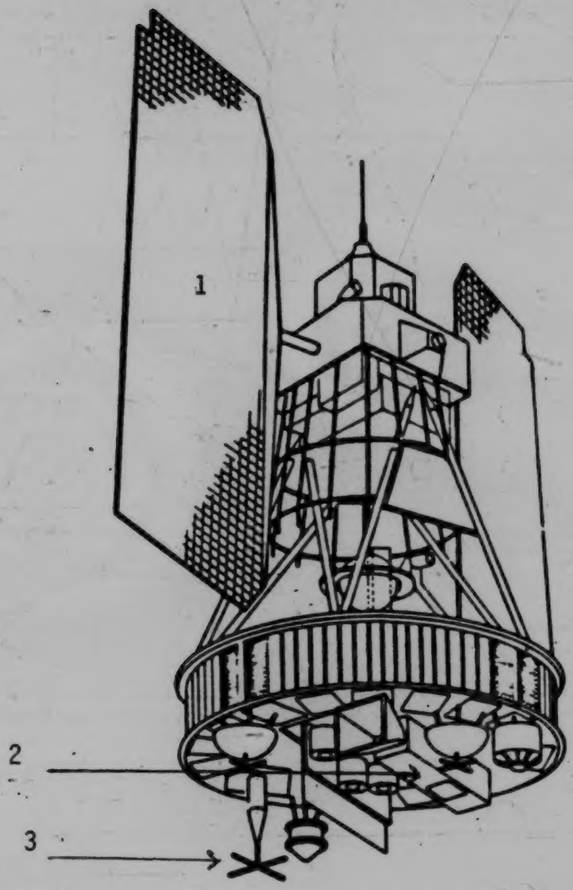
INTERPRETATION DETAILS

Since you will be working with the composite false color images, it is very important that you become familiar with the colors produced by color infrared film. So, please pay close attention to the chart which follows.

The chart indicates the natural color of different vegetation, and also the color this same vegetation would appear on infrared film. The colors you would see naturally are named on the left side of the chart. Vegetation and other substances in color infrared are described on the right of the chart.

Natural Color	Vegetation	Color Infrared
Bright Green	Healthy Deciduous Trees Green Grasses, Algae	Bright Red Pink
Dull Green	Needleleaf Trees Shrubs, Stressed Vegetation	Magenta Purple
Red	Autumn Foliage	Green
White	Forest Clearing	White
Yellow	Wheat	White

Natural Color	Other Substances	Color Infrared
Red	Red Soils	Green/Yellow
Blue Blue to Brown	Clear Water Sedimented Water	Black Light Blue
Black	Dark Bare Soil	Blue/Black



DATA FOR LANDSAT 1, 2 AND 3

HEIGHT ____________

DIAMETER 1.5 M

SOLAR PANELS EXTEND TO 4 M

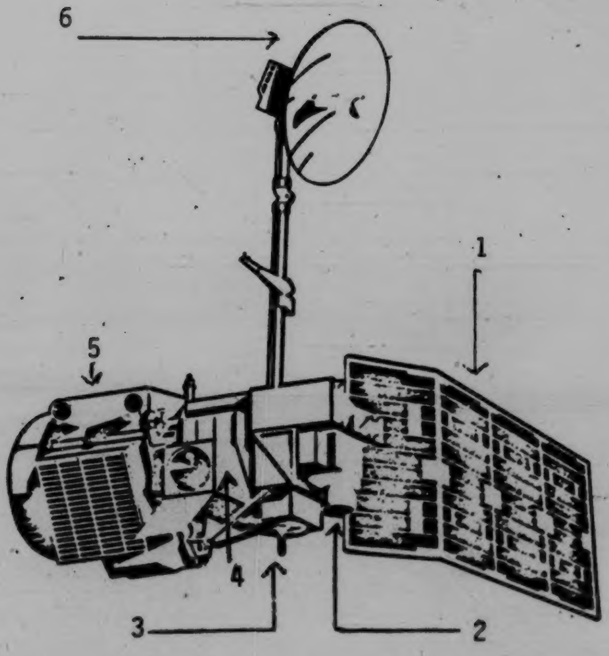
WEIGHT 815 KG

ORBIT

#1 LAUNCHED 23 JULY '72
SHUTDOWN JAN '78

#2 LAUNCHED 21 JAN '75
SHUTDOWN FEB '75

FROM 15 JULY '81 TRANSMITS
ON DEMAND ONLY



DATA FOR LANDSAT 4

LAUNCHED ____________

ORBIT HEIGHT ____________

ORBIT TIME 98.9 MIN

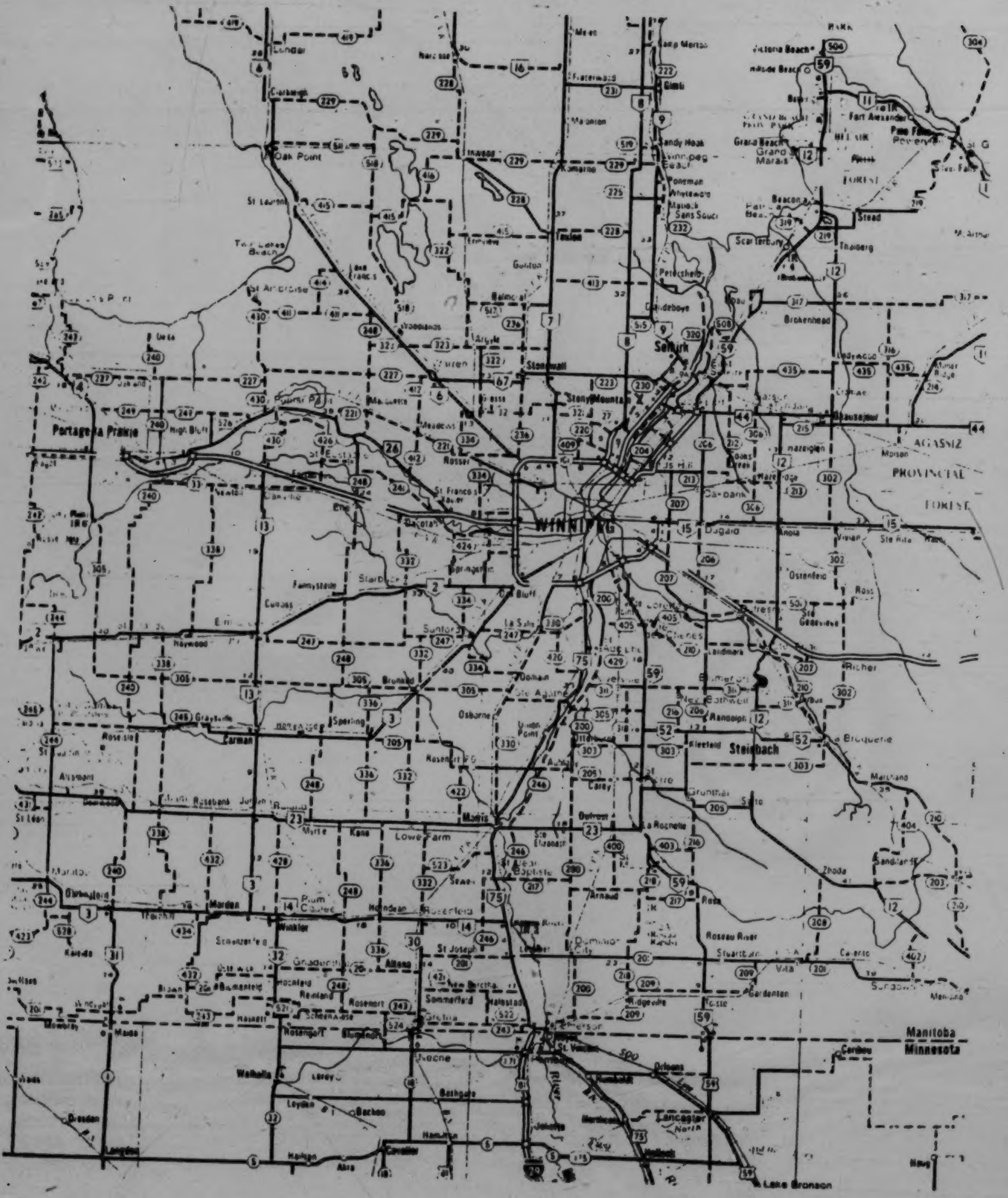
HEIGHT 5.5 M

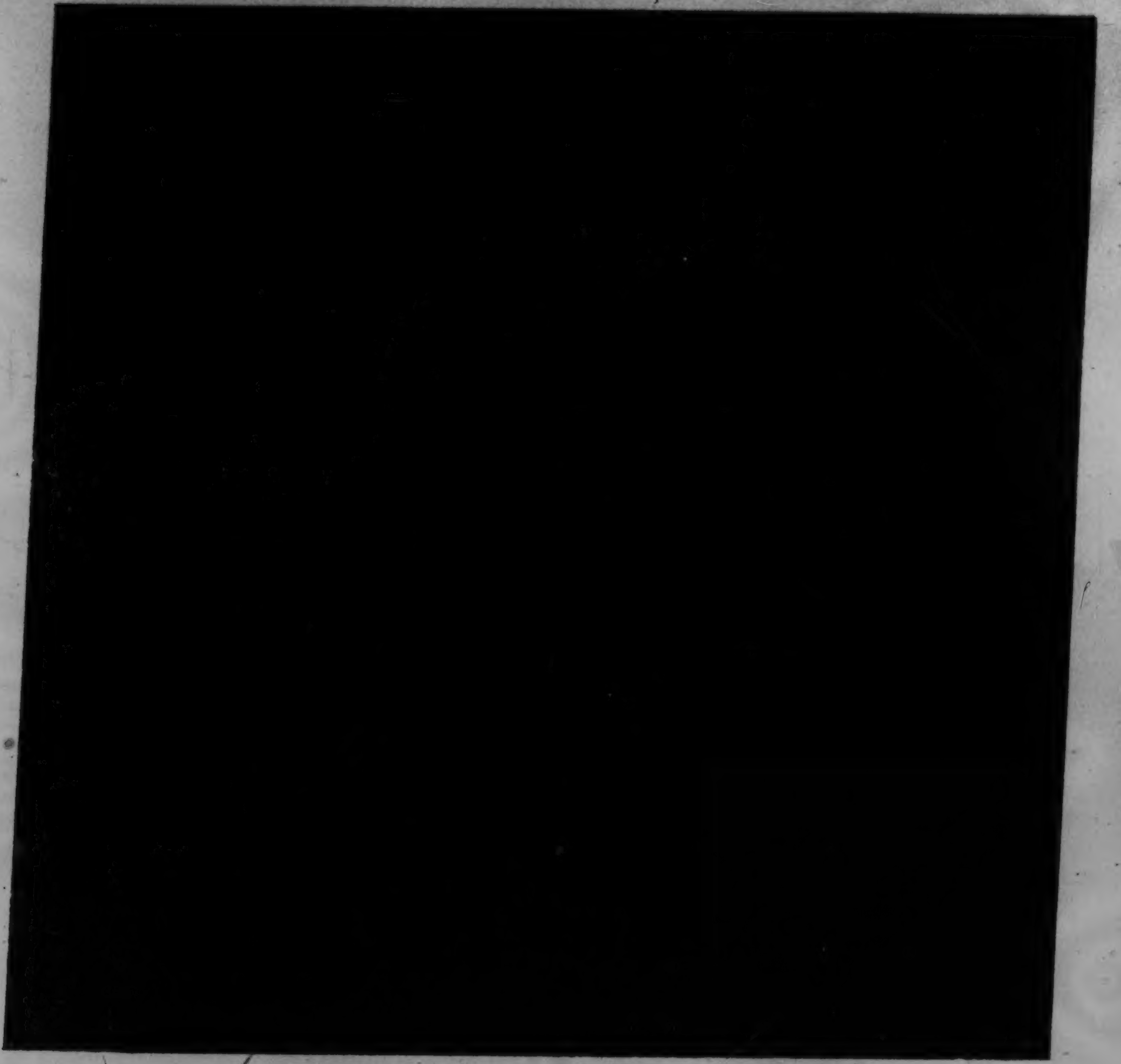
LENGTH 4 M

WIDTH 2 M

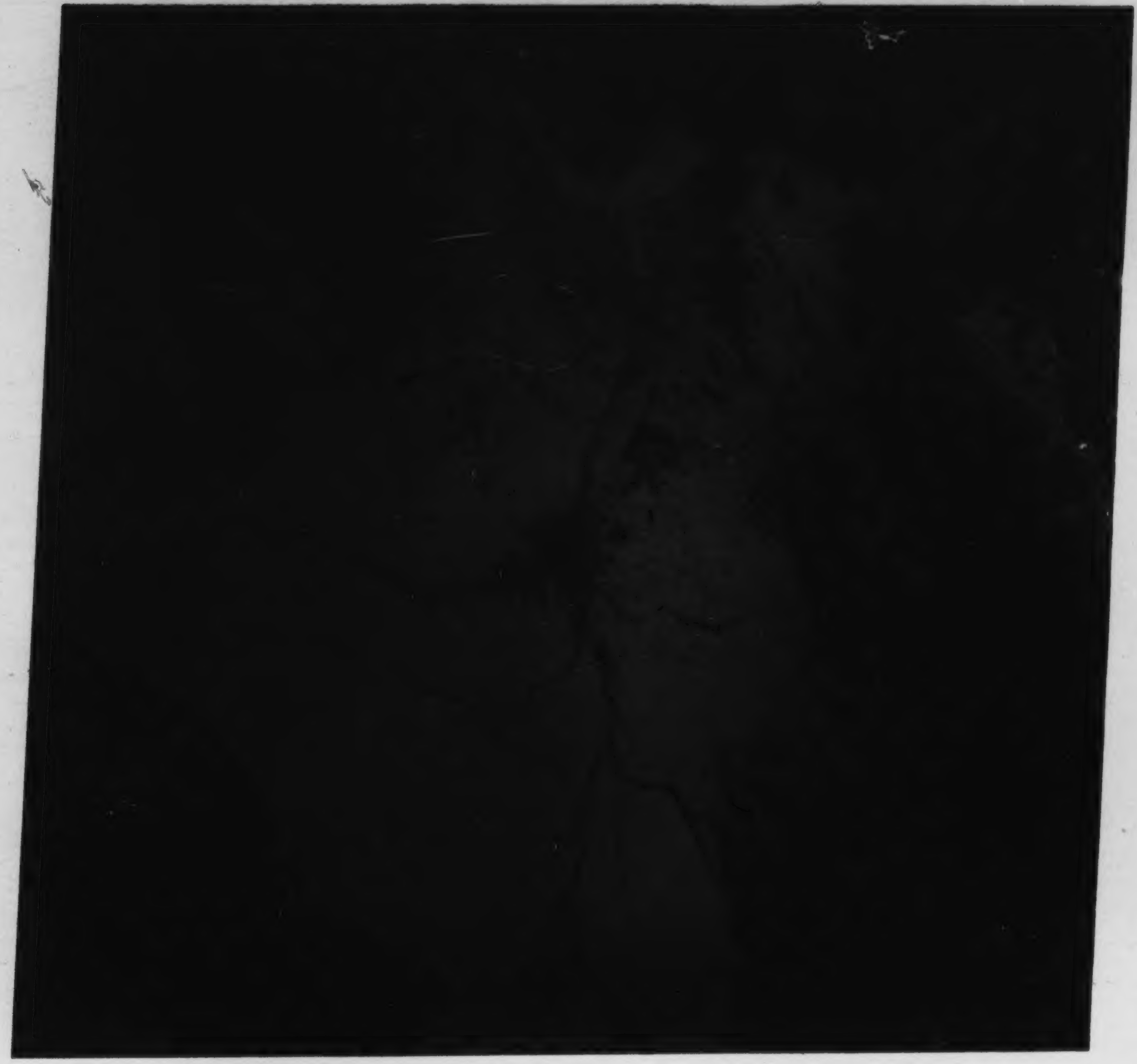
WEIGHT 2000 KG

SOLAR PANELS 13.6 M SQ


WINNIPEG
Portage la Prairie
Selkirk
Stonewall
Stony Mountain
Gimli
Winnipeg Beach
Sandy Hook
Victoria Beach
Grand Marais
Grand Beach
Fort Alexander
Pine Falls
Scanterbury
Teulon
Oak Point
St Laurent
Twin Lakes Beach
St Ambroise
High Bluff
Beausejour
AGASSIZ
PROVINCIAL
FOREST
Oakbank
Dugald
Anola
Ste Anne
Richer
Ross
Steinbach
Grunthal
Marchand
La Broquerie
Niverville
Landmark
New Bothwell
Kleefeld
Randolph
St Malo
Ste Agathe
Oak Bluff
Starbuck
Sanford
La Salle
Brunkild
Osborne
Morris
Carman
Graysville
Roseisle
Sperling
Rosenort
Lowe Farm
St Jean Baptiste
Letellier
Dominion City
Arnaud
Rosa
Roseau River
Stuartburn
Vita
Gardenton
Ridgeville
Emerson
Morden
Winkler
Altona
Gretna
Plum Coulee
Rosenfeld
Horndean
St Joseph
Schanzenfeld
Hochfeld
Reinland
Rosengart
Sommerfeld
Halbstadt
Blumenort
Kane
Myrtle
Manitou
Darlingford
Kaleida
Mowbray
Walhalla
Langdon
Cavalier
Hallock
Lancaster
Lake Bronson
Pembina
St. Vincent
Orleans
Humboldt
Kennedy
Caribou
Manitoba
Minnesota
St Léon
Altamont
Gladstone



WINNIPEG, CANADA
August 26, 1976



WINNIPEG, CANADA
December 6, 1975

APPENDIX G

A LANDSAT COLOR 1 CAI PROGRAM FOR GRADE SIX STUDENTS

(Computer Print Out)

```
READY.

READY.

 1 PRINT"⊐":POKE59468,12:POKE144,88:REM 6 PART LANDSAT PROGRAM:REM ALPHA
 2 POKE 216,3:PRINT:POKE 198,8:PRINT"##########################"
 3 FOR I=1TO10:POKE198,8 :PRINT   "#                   #":NEXT I
 4 POKE 216,13:PRINT:POKE 198,8:PRINT"######################"
 5 POKE216,5:PRINT:POKE198,12:PRINT" USE OF LANDSAT "
 6 POKE216,7:PRINT:POKE198,13:PRINT"    IMAGES "
 7 POKE 216,9:PRINT:POKE 198,18:PRINT"BY"
 8 POKE 216,11:PRINT:POKE198,14:PRINT"BRIAN BURKE"
 9 POKE216,18:PRINT:POKE198,7:PRINT"COPYRIGHT BRIAN BURKE 1983":GOSUB10000
 12 PRINT"HERE ARE SOME IMPORTANT RULES YOU NEED":PRINT
 13 PRINT"TO RUN THE PROGRAM.":FORJ=1TO2000:NEXTJ:PRINT
 14 PRINT"WHEN YOU SEE THE LITTLE LIGHT (CURSOR)":PRINT
 15 PRINT"FLASHING, YOU TYPE IN THE ANSWER,THEN":PRINT
 16 PRINT"PRESS THE ▒RETURN■ KEY.":FORJ=1TO3000:NEXTJ:PRINT
 17 PRINT"IF YOU WANT TO CORRECT A TYPING ERROR,":PRINT
 18 PRINT"BEFORE YOU HAVE PRESSED RETURN,YOU USE":PRINT
 19 PRINT"THE ▒INST DEL■ KEY LIKE AN ERASER.":FORJ=1TO3000:NEXTJ:PRINT
 20 PRINT"PLEASE READ CAREFULLY AND FOLLOW ANY":PRINT
 21 PRINT"INSTRUCTIONS AS GIVEN - NO SHORT CUTS.":GOSUB 10000
 24 PRINT"      ▒PLEASE TAKE NOTES AT ANY TIME.■":PRINT
 25 PRINT"DO NOT COPY ALL OF THE DISPLAY.":PRINT
 26 PRINT"COPY ONLY THE MAIN POINTS.":PRINT:PRINT
 27 PRINT"SHOULD THE CURSOR AND THE WORD READY":PRINT
 28 PRINT"APPEAR ON THE SCREEN DO NOT PANIC.":PRINT
 29 PRINT"JUST TYPE IN CONTINUE AND THEN RETURN":PRINT
 30 PRINT"AND THE PROGRAM WILL BE RESTORED.":PRINT:PRINT
 35 PRINT"GOOD LUCK IN THE PROGRAM!":GOSUB10000
 40 PRINT"WE ARE NOW GOING TO START A PROGRAM":PRINT
 41 PRINT"THAT WILL HELP YOU TO UNDERSTAND HOW WE":PRINT
 42 PRINT"USE IMAGES FROM THE LANDSAT SATELLITE.":PRINT
 43 PRINT"THE NEXT DISPLAY WILL BE THE INDEX.":PRINT
 44 PRINT"IT WILL HELP YOU SELECT THE LESSON":PRINT
 45 PRINT"YOU NEED,OR THE FINAL REVIEW.":GOSUB 10000
 46 PRINT"⊐"
 47 POKE216,2:PRINT:POKE 198,9:PRINT"REMOTE SENSING COURSE":PRINT
 48 POKE 198,9:PRINT"1. REMOTE SENSING":PRINT
 49 POKE 198,9:PRINT"2. LANDSAT SATELLITES":PRINT
 50 POKE 198,9:PRINT"3. WINNIPEG.":PRINT
 52 POKE 198,9:PRINT"4. FINAL REVIEW AND QUIZ.":PRINT
 54 POKE 198,5:PRINT"TYPE IN NAME OF THE LESSON.":PRINT
 56 POKE 198,9:GOSUB9999:IFX$=""THENPRINT"⊐":GOTO47
 57 IFX$="REMOTE SENSING" GOTO 65
 58 IFX$="LANDSAT SATELLITES"GOTO 2930
 59 IFX$="WINNIPEG" GOTO 2940
 61 IFX$="FINAL REVIEW AND QUIZ" GOTO2960
 65 PRINT"⊐":PRINT"HELLO,WHAT NAME WOULD YOU LIKE ME TO USE":PRINT
 66 PRINT"WHEN TALKING TO YOU?":PRINT
 67 OPEN1,0:INPUT#1,A$:PRINT:CLOSE1:PRINT:IFA$=""THEN PRINT"⊐":GOTO65
 70 PRINT"HAVE YOU TYPED IT IN CORRECTLY?":PRINT
 73 PRINT"ENTER YES OR NO.":PRINT:GOSUB9999:IFX$=""THENPRINT"⊐":GOTO70
 74 IFX$="NO"THEN:PRINT:GOTO80
 75 IF X$="YES" THEN PRINT:GOTO90
 80 PRINT"PLEASE TYPE IN THE CORRECT NAME.":PRINT:GOTO 67
```

```
READY.

 90 PRINT"⊐":PRINT"I'M PLEASED TO MEET YOU, "A$"!":GOSUB 10000
 100 POKE216,3:PRINT:POKE198,7:PRINT"WHAT IS REMOTE SENSING?"
 101 POKE 216,4:PRINT:POKE198,6:PRINT"────────────────────────":PRINT
 105 PRINT"REMOTE SENSING IS GETTING INFORMATION":PRINT
 110 PRINT"ABOUT AN OBJECT WITHOUT HAVING TO":PRINT
 115 PRINT"ACTUALLY TOUCH IT.":PRINT
 120 PRINT"      THIS IS VERY IMPORTANT,"A$".":GOSUB10000
 125 PRINT"⊐":PRINT"FOR REMOTE SENSING DO YOU NEED TO":PRINT
 130 PRINT"ACTUALLY TOUCH AN OBJECT?,":PRINT:PRINT"TYPE YES OR NO.":PRINT
 135 GOSUB9999:PRINT:IFX$=""THENPRINT"⊐":GOTO125
 140 IFX$<>"NO" THEN155:PRINT
 145 IF X$="NO"THENPRINT:PRINT"RIGHT ON! "A$"."
 150 GOTO 170
 155 PRINT"OH COME ON! YOUR'E DREAMING "A$"."
 160 FOR J = 1 TO 1000:NEXT J:GOTO125
 170 GOSUB 10000
 180 PRINT"YOU CAN IDENTIFY YOUR FRIEND ACROSS":PRINT
 190 PRINT"THE PLAYGROUND OR WATCH THE SPACE":PRINT
 200 PRINT"SHUTTLE TAKE OFF OR LAND BY REMOTE ":PRINT:PRINT"SENSING.":PRINT
 210 PRINT"WHICH PARTS OF YOUR BODY WOULD ACT":PRINT
 220 PRINT"AS YOUR REMOTE SENSORS?":PRINT:GOSUB9999:IFX$=""THENPRINT"⊐":GOTO180
 230 IF X$ = "EYES" THEN 280
 250 PRINT:PRINT"YOU ARE NOT READING CAREFULLY ,"A$".":PRINT
 260 PRINT:PRINT"TRY AGAIN "A$".":FOR I=1TO1000:NEXT I
 270 PRINT"⊐":GOTO 210
 280 PRINT:PRINT"THAT'S CORECT,"A$",YOU'RE SMART!":GOSUB10000
 290 PRINT  "HOW COULD YOU SAVE WHAT YOU SAW,"A$:PRINT
 300 PRINT"TO SHOW SOMEONE ELSE LATER?":PRINT:GOSUB9999
 301 IFX$=""THEN PRINT "⊐":GOTO290
 310 PRINT"IF YOU SAID BY A PHOTOGRAPH,VIDEO-TAPE,":PRINT
 320 PRINT"MOVIE FILM,OR EVEN A DRAWING,YOU WERE":PRINT
 330 PRINT"CORRECT.THEY ARE ALL IMAGES THAT WERE":PRINT
 340 PRINT"SAVED FOR LATER USE BY ANYONE.":PRINT
 350 PRINT"THIS IS ANOTHER VERY IMPORTANT POINT.":PRINT
 360 PRINT"IMAGES CAN BE SAVED ON TAPE OR FILM.":GOSUB10000
 370 PRINT" WE USE OUR BODIES' REMOTE SENSORS EVERY"
 380 PRINT"DAY TO GATHER INFORMATION FROM OUR":PRINT
 390 PRINT"SURROUNDINGS BY SIGHT,SOUND OR SMELL.":PRINT
 400 PRINT"WE DO NOT CLASSIFY TOUCH OR TASTE AS":PRINT
 410 PRINT"REMOTE SENSORS,BECAUSE PHYSICAL CONTACT":PRINT
 420 PRINT"IS REQUIRED FOR THEM TO WORK.":PRINT
 430 PRINT" OUR REMOTE SENSORS ARE THE SENSES OF:-":PRINT
 440 PRINT"          SIGHT,HEARING AND SMELL.":GOSUB 10000
 480 PRINT"IF A LIGHT BULB REPRESENTS THE SUN WE":PRINT
 490 PRINT"CAN SEE THE LIGHT,BUT WE CAN ALSO FEEL":PRINT
 500 PRINT"THE HEAT GENERATED WITHOUT TOUCHING IT.":PRINT
 510 PRINT"IN THE SAME WAY THE SUN GIVES OFF MORE":PRINT
 520 PRINT"ENERGY THAN WE CAN SEE.":FOR  J=1TO2000:NEXT J:PRINT
 530 PRINT"THE LIGHT WE CAN SEE IS CALLED THE":PRINT
 540 PRINT"           'VISIBLE SPECTRUM'.":GOSUB 10000
 550 PRINT"WHAT CAN WE FEEL THAT IS GIVEN OFF BY":PRINT
 560 PRINT"BOTH THE SUN AND A LIGHT BULB?":PRINT
 570 FORI=1 TO10:GETC$:NEXTI:REM B/D
 580 INPUTX$:IFX$=""THENPRINT"⊐":GOTO550
```

```
READY.

 590 IFX$="HEAT"THEN 620
 600 IFX$<>"HEAT"THEN610
 610 PRINT:PRINT"OH!OH!THAT'S WAY OUT,"A$ "TRY AGAIN.":FORJ=1TO2000:NEXTJ
 611 PRINT"⊐":GOTO550
 620 PRINT:PRINT"I'M GLAD YOU WERE NOT ASLEEP!":GOSUB10000
 640 PRINT"HAVE YOU EVER SEEN ONE OF THE LARGE":PRINT
 650 PRINT"SCREEN PROJECTION T.V. SETS?":PRINT
 655 GOSUB9999:PRINT:IFX$=""THENPRINT"⊐":GOTO640
 660 IF X$="Y"THEN 690:PRINT
 661 IF X$="YES" THEN 690:PRINT
 670 PRINT"TAKE A CLOSE LOOK AT ONE THE NEXT TIME":PRINT
 680 PRINT"YOU GET A CHANCE.":FOR J=1TO 1500:NEXT J:GOTO 710
 690 PRINT" THAT'S GREAT! I WOULD LIKE TO HAVE ONE":PRINT:PRINT"OF THEM!":PRINT
 700 FOR J=1 TO 2000:NEXT J
 710 PRINT"⊐":PRINT"THREE LENSES ARE PROJECTING LIGHT ONTO":PRINT
 720 PRINT"THE T.V. SCREEN.THEY ARE BLUE,GREEN AND":PRINT
 730 PRINT"RED. THESE ARE THE ■PRIMARY COLOURS■.":PRINT:PRINT
 740 FOR J=1 TO 2000:NEXT J
 780 PRINT"BY MIXING THESE COLOURS WE CAN MAKE":PRINT
 790 PRINT"ANY COLOUR OF THE ■VISIBLE SPECTRUM■.":PRINT
 800 PRINT"WHICH IS WHAT YOU SEE ON YOUR T.V.":PRINT
 810 PRINT"SCREEN - LARGE OR SMALL.":GOSUB 10000
 815 PRINT"LET'S TAKE A LOOK AT WHAT MAKES UP THE":PRINT
 817 PRINT"VISIBLE SPECTRUM.":GOSUB10000
 820 PRINT"          ■THE VISIBLE SPECTRUM■ ":PRINT
 830 PRINT"
 832 PRINT"  VIOLET    \
 833 PRINT"
 834 PRINT"  INDIGO     \
 835 PRINT"                    ^
 836 PRINT"  BLUE         \    / \ ← ← ← ← ← ← ←"
 837 PRINT"                 - /   \← ← WHITE ← ←"
 838 PRINT"  GREEN         /-/     \ ←LIGHT ← ←"
 839 PRINT"                  / PRISM \← ← ← ← ← ←"
 840 PRINT"  YELLOW      / /          \ "
 841 PRINT"               ____________"
 842 PRINT"  ORANGE     /
 843 PRINT"
 844 PRINT"  RED      /":PRINT:PRINT:PRINT
 860 PRINT"  THESE ARE IN ORDER OF FREQUENCY,FROM":PRINT
 870 PRINT"           HIGHEST TO LOWEST.":GOSUB 10000
 880 PRINT"■THE INVISIBLE SPECTRUM■ (HIGH FREQUENCY)"
 881 PRINT""
 882 PRINT"  GAMMA RAYS    ← ← ← ← ← ← ← ← ← ← ← ←"
 883 PRINT"                ← ←  INVISIBLE  ← ← ← ←"
 884 PRINT"  X RAYS        ← ← ← ← ← ← ← ← ← ← ← ←"
 885 PRINT"                ← ←  SPECTRUM   ← ← ← ←"
 886 PRINT"  ULTRA VIOLET  ← ← ← ← ← ← ← ← ← ← ← ←"
 887 PRINT"  ______________________________________
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```
READY.

 888 PRINT"  VIOLET     \"
 889 PRINT"  INDIGO      \      /\
 890 PRINT"  BLUE         \   /   \     WHITE ← ←"
 891 PRINT"  GREEN        >─/      \← ← ← ← ← ← ←"
 892 PRINT"  YELLOW      / /        \   LIGHT ← ←"
 893 PRINT"  ORANGE     /  / PRISM   \"
 894 PRINT"  RED       /  ─────────────":PRINT:PRINT
 895 PRINT"GAMMA RAYS,X-RAYS AND ULTRA VIOLET RAYS":PRINT
 896 PRINT"     ARE INVISIBLE FORMS OF RADIATION":GOSUB 10000
 904 PRINT"  ■THE INVISIBLE SPECTRUM■(LOW FREQUENCY)":PRINT
 905 PRINT"  VIOLET     \"
 906 PRINT"  INDIGO      \      /\
 907 PRINT"  BLUE         \   /   \     WHITE ← ←"
 908 PRINT"  GREEN        >─/      \← ← ← ← ← ← ←"
 909 PRINT"  YELLOW      / /        \   LIGHT ← ←"
 910 PRINT"  ORANGE     /  / PRISM   \"
 911─PRINT"  RED       /  ─────────────"
 912 PRINT"  ─────────────────────────────────────────────"
 913 PRINT"  INFRARED    ← ← ← ← ← ← ← ← ← ← ← ← ← ":PRINT
 914 PRINT"  MICROWAVES ← ←  INVISIBLE  ← ← ← ← ← ":PRINT
 915 PRINT"  RADAR      ← ←  SPECTRUM   ← ← ← ← ← ":PRINT
 916 PRINT"  RADIO WAVES  ← ← ← ← ← ← ← ← ← ← ← ← ← ":PRINT:PRINT
 920 PRINT"  INFRARED,MICROWAVES,RADAR AND RADIO":PRINT
 921 PRINT"  WAVES ARE ALSO INVISIBLE RADIATION":GOSUB10000
 930 PRINT"         ■ THE TOTAL SPECTRUM ■":PRINT
 931 PRINT"■    GAMMA RAYS     ■ \"
 932 PRINT"■      X-RAYS       ■  >-■ INVISIBLE ■"
 933 PRINT"■ ULTRA VIOLET RAYS ■ /":PRINT
 934 PRINT"VIOLET  \"
 935 PRINT"INDIGO   \"
 936 PRINT"BLUE      \"
 937 PRINT"GREEN      >────────── VISIBLE LIGHT"
 938 PRINT"YELLOW    /"
 939 PRINT"ORANGE   /"
 940 PRINT"RED     /":PRINT
 950 PRINT "■   INFRARED  ■ \"
 951 PRINT "■  MICROWAVE  ■  \────────■ INVISIBLE ■"
 952 PRINT "■    RADAR    ■ /
 953 PRINT "■ RADIO WAVES ■ /":PRINT
 954 PRINT"  THIS IS THE SUN'S TOTAL RADIATION.":PRINT
 955 PRINT"AS YOU CAN SEE NOT ALL OF IT IS VISIBLE.":GOSUB 10000
 970 PRINT"HERE ARE SOME FORMS OF RADIATION.":PRINT
 980 PRINT"TELL ME TO WHICH PART OF THE SPECTRUM":PRINT
 990 PRINT"THEY BELONG.":PRINT
1000 PRINT"USE THE CORRECT TERM FOR IT PLEASE.":PRINT
1010 PRINT"RED":PRINT:GOSUB9999:PRINT:IFX$=""THENPRINT"❐":GOTO1010
1020 IFX$<>"VISIBLE"THENPRINT"INCORRECT.THAT'S TOO BAD.":PRINT:GOTO 1010
1030 IFX$="VISIBLE"THENPRINT"CORRECT.JUST ASK A MATADOR!":GOSUB10000
1040 PRINT:PRINT"ULTRA VIOLET":PRINT:GOSUB9999:IFX$=""THENPRINT"❐":GOTO1040
1050 IFX$<>"INVISIBLE"THEN GOTO1062
1060 IFX$="INVISIBLE"THEN GOTO1065
1062 PRINT:PRINT"THAT'S INCORRECT,"A$".":GOTO1040
1065 PRINT:PRINT"THAT'S RIGHT,BUT IT GIVES YOU A SUNTAN.":GOSU!10000
```

```
READY.

1070 PRINT"INDIGO":PRINT:GOSUB9999:IFX$=""THENPRINT"□":GOTO1070
1080 IFX$<>"VISIBLE"THENPRINT:PRINT"YOU BLEW THIS ONE "A$".":PRINT:GOTO1070
1090 IFX$="VISIBLE"THENPRINT:PRINT"IT SURE IS A PRETTY COLOUR!":GOSUB10000
1100 PRINT"INFRA RED":PRINT:GOSUB9999:IFX$=""THENPRINT"□":GOTO1100
1110 IFX$<>"INVISIBLE"THENPRINT:PRINT"IT DOES NOT COMPUTE!":PRINT:GOTO1100
1120 IFX$="INVISIBLE"THEN PRINT:GOTO1125
1125 PRINT"THAT'S RIGHT. THEY'RE HEAT WAVES.":GOSUB10000
1130 PRINT"RADAR":PRINT:GOSUB9999:IFX$=""THENPRINT"□":GOTO1130
1140 IFX$<>"INVISIBLE"THENPRINT:PRINT"THAT'S NOT TRUE!":PRINT:GOTO1130
1150 IFX$="INVISIBLE"THENPRINT:PRINT"RIGHT ON!"A$".":GOSUB10000
1160 PRINT:PRINT"GREEN":PRINT:GOSUB9999:IFX$=""THENPRINT"□":GOTO1160
1170 IFX$<>"VISIBLE"THENPRINT:PRINT"OH!OH! A BOOBOO!":PRINT:GOTO1160
1180 IFX$="VISIBLE"THENPRINT:PRINT"YOU 'VE GOT IT!":GOSUB10000
```

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1190 PRINT"                   ____◤       "
1192 PRINT"                   ┴▀▀▀▀┴      "
1193 PRINT"                   ╱▔▔▔▔╲      "
1194 PRINT"                 ╱        ╲    "
1195 PRINT"                ◥  ▀▀▀▀▀▀  ◤   "
1196 PRINT"                 ╲< •  • >╱    "
1197 PRINT"                  ╲      ╱     "
1198 PRINT"                  < ╰──╯ >     "
1199 PRINT"                   ╲    ╱      "
1200 PRINT"                     ▀▀        ":PRINT:PRINT
1209 PRINT"HI! "A$ :PRINT
1210 PRINT"JUST THOUGHT I'D DROP IN TO SEE IF YOU":PRINT
1220 PRINT"WANTED A SHORT REVIEW.OR WOULD YOU":PRINT
1230 PRINT"RATHER CONTINUE?":PRINT
1240 PRINT"TYPE IN R FOR REVIEW OR C TO CONTINUE.":PRINT
1245 GOSUB9999:IFX$=""THENPRINT"□":GOTO1240
1250 IF X$ ="C" GOTO 2170:IF X$ ="R"GOTO1270.
1260 IF X$ <>"R"GOTO 1240:IF X$ <>"C"GOTO1240
1270 GOSUB 10000
1289 POKE 198,10:PRINT"REVIEW #1":POKE198,9:PRINT"────────── ":PRINT
1290 PRINT"REMOTE SENSING IS GETTING INFORMATION":PRINT
2000 PRINT"ABOUT AN OBJECT WITHOUT HAVING TO":PRINT
2010 PRINT"ACTUALLY TOUCH IT.":PRINT
2020 PRINT"IMAGES CAN BE SAVED ON TAPE OR FILM.":PRINT
2030 PRINT"OUR REMOTE SENSORS ARE THE SENSES OF:-":PRINT
2040 PRINT"       SIGHT,HEARING AND SMELL.":GOSUB 10000
2070 PRINT"THERE ARE VISIBLE AND INVISIBLE FORMS":PRINT
2075 PRINT"OF RADIATION. WE CALL THE VISIBLE FORM":PRINT
2076 PRINT"LIGHT, WHICH MAY BE WHITE OR COLOURED.":PRINT
2080 PRINT"BLUE,GREEN AND RED ARE THE PRIMARY":PRINT
2090 PRINT"COLOURS OF VISIBLE LIGHT.":PRINT
2100 PRINT"WHEN MIXED THEY CAN MAKE ANY COLOUR.":GOSUB 10000
2120 PRINT"GAMMA RAYS,X-RAYS AND ULTRA-VIOLET":PRINT
2130 PRINT"RAYS ARE INVISIBLE.":PRINT
2140 PRINT"INFRARED,MICROWAVES,RADAR AND RADIO":PRINT
2150 PRINT"RAYS ARE ALSO INVISIBLE.":PRINT:PRINT:PRINT:PRINT:
2160 PRINT"      THAT'S ALL FOR THIS REVIEW.":GOSUB 10000
2170 PRINT"□":PRINT"MOST OBJECTS REFLECT SOME RADIATION.":PRINT
2180 PRINT"WE CAN'T ALWAYS SEE THIS REFLECTION.":PRINT
2190 PRINT"BUT IT CAN BE MEASURED BY INSTRUMENTS.":PRINT
```

```
READY.

 2200 PRINT"THIS INSTRUMENT IS CALLED A PHOTOMETER.":GOSUB 10000
 2210 PRINT"         "
 2230 PRINT" ─────────      PHOTO       ▁▁▁      "
 2235 PRINT" |...... |    ELECTRIC -> ▓▓▓← ← ← ← ←
 2236 PRINT" |. \  . |      CELL      ▓▓▓← LIGHT ← "
 2237 PRINT" └───⌒───┘             ┌─▓▓▓← ← ← ← ← "
 2238 PRINT" ▌LIGHT  ▌             │ ▔▔▔     "
 2239 PRINT" ▌METER  ▌   ▁▁▁▁▁▁▁▁▁▁└─    "
 2240 PRINT" ──┌────  -▌  POWER    ▌    "
 2241 PRINT"   ▔▔▔▔▔▔▔▔▌ AMPLIFIER ▌    "
 2242 PRINT"           ▔▔▔▔▔▔▔▔▔▔▔▔▔     ":PRINT
 2310 PRINT"THE LIGHT RAYS FALL ON A PHOTO ELECTRIC":PRINT
 2320 PRINT"CELL WHICH CHANGES THEM INTO A CURRENT.":PRINT
 2330 PRINT"THIS PASSES THROUGH AN AMPLIFIER WHERE":PRINT
 2332 PRINT"IT IS MADE STRONGER SO IT CAN MOVE THE ":PRINT
 2334 PRINT"NEEDLE ON THE LIGHTMETER.":GOSUB 10000
 2336 PRINT"REMEMBER THAT ANY ELECTRIC CURRENT":PRINT
 2338 PRINT"CAN BE RECORDED ON MAGNETIC TAPE.":PRINT
 2350 PRINT"OR CONVERTED TO A RADIO SIGNAL":PRINT
 2360 PRINT"WHICH CAN THEN BE TRANSMITTED.":PRINT
 2370 PRINT"RADIO SIGNALS CAN BE CHANGED BACK,":PRINT
 2390 PRINT"OR BE RECORDED TO BE PLAYED LATER.":GOSUB 10000
 2400 PRINT"WHAT IS A MACHINE THAT USES MAGNETIC":PRINT
 2410 PRINT"TAPE TO CONVERT RECORDED ELECTRIC":PRINT
 2420 PRINT"SIGNALS TO SOUND?":PRINT:GOSUB9999:IFX$=""THENPRINT"]":GOTO2400
 2421 IFX$="TAPE RECORDER"THENGOSUB10050
 2422 IFX$="8-TRACK PLAYER"THENGOSUB10050
 2423 IFX$="CASSETTE RECORDER"THEN GOSUB 10050
 2425 PRINT"]":PRINT"THERE ARE MANY THINGS THAT CONVERT":PRINT
 2426 PRINT"TAPED SIGNALS BACK TO SOUND SUCH AS":PRINT
 2430 PRINT"CASSETTE RECORDERS,TAPE RECORDERS":PRINT
 2440 PRINT"AND 8-TRACK PLAYERS.THERE ARE OTHER":PRINT
 2441 PRINT"DEVICES THAT ALSO DO THIS BUT YOU MAY":PRINT
 2442 PRINT"NOT KNOW ABOUT THEM.":GOSUB 10000
 2450 PRINT"WHAT MACHINES CONVERT TAPED SIGNALS":PRINT
 2460 PRINT"TO LIGHT AND SOUND":PRINT:GOSUB9999:IFX$=""THENPRINT"]":GOTO2450
 2461 IFX$="VIDEO RECORDER"THEN GOSUB10050:GOTO2476
 2462 IFX$="TV"THEN GOSUB10050:GOTO2476
 2463 IFX$="VIDEO"THEN GOSUB10050:GOTO2476
 2464 IFX$="TELEVISION"THEN GOSUB10050:GOTO2476
 2466 IFX$<>"TV"THEN GOSUB10150:GOTO2476
 2467 IFX$<>"VIDEO RECORDER"THEN GOSUB10150:GOTO2476
 2468 IFX$<>"TELEVISION" THEN GOSUB10152:GOTO2476
 2469 IFX$<>"VIDEO"THEN GOSUB10150:GOTO 2476
 2476 PRINT:PRINT:PRINT"VIDEO RECORDERS,TELEVISION AND EVEN ":PRINT
 2478 PRINT"COMPUTERS CHANGE MAGNETIC TAPE IMPULSES":PRINT
 2480 PRINT"TO BOTH LIGHT AND SOUND, SO DO THE VERY":PRINT
 2481 PRINT"POPULAR VIDEO-GAMES,FOR OUR ENJOYMENT.":GOSUB 10000
 2490 PRINT"INVISIBLE RADIATION CAN BE CHANGED":PRINT
 2491 PRINT"INTO A FORM WE SEE BY SENSING IT":PRINT
 2492 PRINT"WITH A PHOTO-ELECTRIC CELL,CHANGING":PRINT
 2493 PRINT"IT TO AN ELECTRIC CURRENT AND PROJECTING"
 2494 PRINT"THE PATTERN AS A DISPLAY ON A SCREEN.":PRINT
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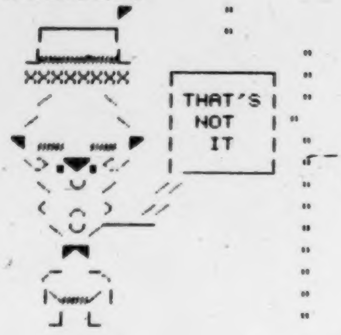
```
READY.

 2495 PRINT"THE BEST EXAMPLE OF THIS IS  THE RADAR":PRINT
 2496 PRINT"SCREEN USED AT AIRPORTS.":GOSUB 10000
 2510 PRINT"THE VISIBLE SPECTRUM IS USED FOR THE":PRINT
 2520 PRINT"NORMAL TELEVISION PROGRAMS WE SEE.":PRINT
 2530 PRINT"HOWEVER X-RAYS,ULTRA VIOLET RAYS,":PRINT
 2531 PRINT"INFRARED,MICROWAVES,RADAR AND RADIO":PRINT
 2540 PRINT"WAVES CAN ALSO BE SHOWN ON A SCREEN.":PRINT:PRINT:PRINT
 2590 PRINT"  THIS IS VERY IMPORTANT "A$".":PRINT
 2600 PRINT"▌ THE VISIBLE AND INVISIBLE SPECTRUM "
 2610 PRINT"  ▌ CAN BE SENSED ELECTRONICALLY. ■":GOSUB 10000
 2620 POKE216,10:PRINT:POKE198,8:PRINT"JUST GIVE ME A MOMENT":PRINT
 2630 POKE216,12:PFINT:PRINT"TO CHECK TO SEE IF THIS UNIT IS ENDED.":GOTO2640
 2640 DLOAD"QUIZ"
 2930 PRINT"⊐":POKE216,10:PRINT:POKE198,6:PRINT"I MUST THINK ABOUT THAT ONE."
 2931 DLOAD"BETA"
 2940 PRINT"⊐":POKE216,10:PRINT:POKE198,6:PRINT"I NEED TIME TO THINK!"
 2941 DLOAD "DELTA"
 2970 PRINT"⊐":POKE216,10:PRINT:POKE198,6:PRINT"I MUST STOP FOR A MOMENT."
 2971 DLOAD"OMEGA"
 9999 OPEN1,0:INPUT#1,X$:PRINT:CLOSE1:RETURN
 10000 POKE 216,23:PRINT:POKE 198,6
 10001 PRINT"PRESS SPACE BAR TO CONTINUE"
 10002 FORI=1 TO10:GETC$:NEXTI
 10003 GET X$:IF X$=""THEN 10003
 10004 IF X$=" "THEN PRINT"⊐":RETURN
 10005 GOTO10003
 10050 PRINT"⊐"
 10052 POKE216,4:PRINT:POKE198.10
 10055 PRINTTAB(10)"            ◤          "
 10060 PRINTTAB(10)"     ┌──────┐          "
 10065 PRINTTAB(10)"    ┴───────┴  ┌───────┐  "
 10070 PRINTTAB(10)"     XXXXXX    | YOU'VE |  "
 10075 PRINTTAB(10)"     /     \   |        |  "
 10080 PRINTTAB(10)"    /       \  |  GOT   |  "
 10085 PRINTTAB(10)"   ◥ ─────── ◤ |        |  "
 10090 PRINTTAB(10)"    \<■   ■>/  |  IT!   |  "
 10095 PRINTTAB(10)"     \     /   |        |  "
 10100 PRINTTAB(10)"     ( \__/ ) //───────   "
 10105 PRINTTAB(10)"      \   /────           "
 10115 PRINTTAB(10)"        ▀▀                "
 10120 PRINTTAB(10)"      ╭─   ─╮             "
 10125 PRINTTAB(10)"      |\___/|             "
 10130 PRINTTAB(10)"       ┘   └              "
 10135 GOTO10000
```



```
READY.

 10150 PRINT"J"
 10152 POKE216,4:PRINT:POKE198,10
 10155 PRINTTAB(10)"             ◤             "
 10160 PRINTTAB(10)"       ┌──────┐            "
 10165 PRINTTAB(10)"      _┖▁▁▁▁▁▁┚_                "
 10170 PRINTTAB(10)"      XXXXXXXX   ┌─────────┐    "
 10175 PRINTTAB(10)"       ╱     ╲   │ THAT'S │    "
 10180 PRINTTAB(10)"      ╱       ╲  │  NOT   │  "
 10185 PRINTTAB(10)"     ◥ ▁▁▁ ▁▁▁ ◤ │   IT   │    "
 10190 PRINTTAB(10)"      ╲>.▼.<╱    │________┘    "
 10195 PRINTTAB(10)"       ╲ ◡ ╱   ╱╱               "
 10200 PRINTTAB(10)"       <  ◠  > ╱╱               "
 10205 PRINTTAB(10)"        ╲ ◡ ╱───────            "
 10215 PRINTTAB(10)"          ▀▀                    "
 10220 PRINTTAB(10)"        ╭─  ─╮                  "
 10225 PRINTTAB(10)"        │╲▁▁▁╱│                 "
 10230 PRINTTAB(10)"         ┘  └                   "
 10235 GOTO 10000


 1 REM ALQU
 2 PRINT"COPYRIGHT BRIAN BURKE 1983"
 3 POKE144,88:POKE59468,12
 5 PRINT"J":POKE216,6:PRINT:POKE198,10:PRINT"THAT'S BETTER!":PRINT
 10 PRINT"THAT WAS THE END OF THIS UNIT. YOU MAY":PRINT
 20 PRINT"THINK THAT A REVIEW IS NEEDED. IF YOU":PRINT
 25 PRINT"DON'T WANT A REVIEW JUST TYPE IN QUIZ.":PRINT
 27 PRINT"TO HAVE THE REVIEW JUST PRESS RETURN.":PRINT
 30 PRINT:GOSUB9999:IFX$="QUIZ"GOTO 460
 32 FOR J=1TO 500:NEXT J:GOSUB 10000
 40 PRINT"J":POKE198,10:PRINT"REVIEW #2":POKE198,9:PRINT"────────────":PRINT
 50 PRINT"REMOTE SENSING IS OBTAINING INFORMATION":PRINT
 60 PRINT"ABOUT AN OBJECT WITHOUT ACTUAL CONTACT.":PRINT
 70 PRINT"IMAGES CAN BE SAVED ON TAPE OR FILM.":GOSUB 10000
 80 PRINT"BLUE,GREEN AND RED ARE THE PRIMARY":PRINT
 90 PRINT"COLOURS OF VISIBLE LIGHT.":PRINT
 100 PRINT"THEY MIX TO MAKE ALL THE OTHER COLOURS.":PRINT
 110 PRINT"RADIATION IS BROKEN DOWN INTO THE":PRINT
 120 PRINT"VISIBLE AND INVISIBLE SPECTRUMS.":GOSUB 10000
 130 PRINT"GAMMA RAYS,X-RAYS,ULTRA VIOLET,INFRARED":PRINT
 140 PRINT"MICROWAVES,RADAR AND RADIO WAVES BELONG":PRINT
 150 PRINT"TO THE INVISIBLE SPECTRUM.":PRINT
 160 PRINT"WE GET BOTH HEAT AND LIGHT FROM THE SUN.":GOSUB10000
 170 PRINT"MOST OBJECTS REFLECT SOME RADIATION.":PRINT
 180 PRINT"THESE REFLECTIONS MAY BE SEEN OR UNSEEN.":PRINT
 190 PRINT"THEY CAN BE DETECTED AND CHANGED INTO":PRINT
 200 PRINT"AN ELECTRIC CURRENT OR A RADIO SIGNAL":PRINT
 210 PRINT"AND BROADCAST OR RECORDED FOR LATER USE.":GOSUB 10000
 220 PRINT"THESE RECORDED SIGNALS CAN BE CONVERTED":PRINT
```

```
READY.

 230 PRINT"TO SOUND,LIGHT, OR LIGHT AND SOUND.":GOSUB10000
 240 PRINT"THE VISIBLE AND INVISIBLE SPECTRUMS CAN":PRINT
 250 PRINT"BE SENSED ELECTRONICALLY AND RECORDED":PRINT
 260 PRINT"FOR LATER USE.THEY CAN ALSO BE SENT":PRINT
 270 PRINT"AS RADIO SIGNALS FOR IMMEDIATE USE":PRINT
 280 PRINT"OR TO BE SAVED AS A MAGNETIC RECORDING":PRINT
 290 PRINT"FOR FUTURE USE.":GOSUB 10000
 295 PRINT"THAT COMPLETES THE REVIEW. NOW IT'S ON":PRINT
 300 PRINT"TO THE UNIT QUIZ. GOOD LUCK!":GOSUB10000
 310 PRINT"HERE IS SOME IMPORTANT INFORMATION":PRINT
 320 PRINT"BEFORE YOU BEGIN THE QUIZ. READ THE":PRINT
 330 PRINT"QUESTIONS CAREFULLY.MAKE SURE OF YOUR":PRINT
 340 PRINT"SPELLING AND CORRECT IT IF NECESSARY":PRINT
 350 PRINT"BEFORE YOU PRESS THE ▚RETURN■  KEY.":GOSUB10000
 360 PRINT"YOU ONLY GET TO TRY ONCE.YOUR SCORE":PRINT
 370 PRINT"WILL BE GIVEN AT THE END.PLEASE ENTER":PRINT
 380 PRINT"IT IN THE CORRECT SPACE IN YOUR FOLDER.":PRINT
 390 PRINT"WORK CAREFULLY AND QUICKLY.":PRINT
 400 PRINT"IT'S NOW TIME FOR THE QUIZ. GOOD LUCK!":GOSUB 10000
 410 PRINT"PLEASE ENTER YOUR NAME.":PRINT:OPEN1,0:INPUT#1,A$:PRINT:CLOSE1:PRINT
 430 PRINT"ENTER THE DATE.":PRINT:GOSUB9999:IFX$=""THENPRINT"Ɔ":GOTO430
 450 LET K= 0
 460 PRINT"Ɔ"
 470 POKE 198,8:PRINT"REMOTE SENSING QUIZ":POKE198,7:PRINT"────────────────────────
 480 PRINT"THE SUN'S ENEPGY IS CALLED":PRINT:GOSUB9999:PRINT
 483 IFX$=""THENPRINT"Ɔ":GOTO480
 485 PRINT"THE TERM WE USED WAS RADIATION.":GOSUB10000:GOTO500
 490 INPUT X$:IF X$="RADIATION"THEN K=K+1:PRINT"Ɔ"
 500 PRINT"Ɔ":PRINT"WHAT DO WE CALL THE VISIBLE SPECTRUM.":PRINT:GOSUB9999:PRINT
 503 IFX$=""THENPRINT"Ɔ":GOTO500
 507 IFX$<>"LIGHT"THENPRINT"LIGHT WAS THE ANSWER.":GOSUB10000
 510 IF X$="LIGHT" THEN K=K+1:PRINT"Ɔ"
 520 PRINT"Ɔ":PRINT"TO MEASURE LIGHT YOU WOULD USE A":PRINT:GOSUB9999
 525 IFX$=""THENPRINT"Ɔ":GOTO520:PRINT
 530 IF X$="LIGHTMETER" THEN K=K+1:PRINT"Ɔ":GOTO550
 535 IF X$="PHOTOMETER" THEN K=K+1:PRINT"Ɔ":GOTO550
 540 IFX$<>"PHOTOMETER LIGHTMETER"THEN :PRINT:GOTO541
 541 PRINT"PHOTOMETER OR LIGHTMETER WOULD BE O.K.":GOSUB10000
 550 PRINT"Ɔ":PRINT"ENTER TRUE OR FALSE FOR THE FOLLOWING:-":PRINT
 560 PRINT"IMAGES CAN BE SAVED ON FILM.":PRINT:GOSUB9999:PRINT
 562 IFX$=""THENPRINT"Ɔ":GOTO560
 564 IFX$<>"TRUE"THENPRINT"THE ANSWER IS TRUE.":GOSUB10000
 570 IF X$="TRUE" THEN K=K+1 :PRINT"Ɔ"
 580 PRINT"Ɔ":PRINT"REMOTE SENSING REQUIRES CONTACT.":PRINT:GOSUB9999:PRINT
 582 IFX$=""THENPRINT"Ɔ":GOTO580
 585 IFX$<>"FALSE"THENPRINT"YOU SHOULD HAVE SAID FALSE.":GOSUB10000
 587 IF X$ ="FALSE" THEN K=K+1:PRINT"Ɔ":GOTO590
 590 PRINT"Ɔ":PRINT"INFRARED RAYS ARE A FORM OF HEAT.":PRINT:GOSUB9999:PRINT
 592 IFX$=""THENPRINT"Ɔ":GOTO590
 595 IFX$<>"TRUE"THENPRINT"THEY ARE A FORM OF HEAT.":GOSUB10000
 597 IFX$="TRUE" THEN K=K+1:PRINT"Ɔ"
 600 PRINT"Ɔ":PRINT"THERE ARE FOUR PRIMARY COLOURS.":PRINT:GOSUB9999:PRINT
 602 IFX$=""THENPRINT"Ɔ":GOTO600
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```
READY.

 605 IFX$<>"FALSE"THENPRINT"LIGHT HAS ONLY THREE PRIMARY COLOURS.":GOSUB10000
 609 IF X$="FALSE" THEN K=K+1:PRINT"⊐"
 610 PRINT"⊐":PRINT"LIGHT CAN'T BE CHANGED INTO ELECTRICITY.":GOSUB9999:PRINT
 612 IFX$=""THENPRINT"⊐":GOTO610
 615 IFX$<>"FALSE"THENPRINT"YOU CAN MAKE ELECTRICITY FROM LIGHT!":GOSUB10000
 619 IF X$ ="FALSE" THEN K=K+1:PRINT"⊐"
 620 PRINT"⊐":PRINT"RADIATION COMES FROM THE SUN.":PRINT:GOSUB9999:PRINT
 622 IFX$=""THENPRINT"⊐":GOTO620
 625 IFX$<>"TRUE"THENPRINT"THAT ANSWER SHOULD BE TRUE.":GOSUB10000
 650 PRINT"⊐":PRINT"RADIATION MAY BE MEASURED AND RECORDED.":PRINT:GOSUB9999
 652 IFX$=""THENPRINT"⊐":GOTO650
 655 IFX$<>"TRUE"THENPRINT:PRINT"THAT ONE IS TRUE.":GOSUB10000
 659 IF X$="TRUE" THEN K=K+1:PRINT"⊐"
 670 PRINT"⊐":PRINT"SOUND CANNOT BE SENT AS A RADIO SIGNAL.":PRINT:GOSUB9999
 672 IFX$=""THENPRINT"⊐":GOTO670
 675 IFX$<>"FALSE"THENPRINT:PRINT"RADIOS COULD NOT WORK WITHOUT IT.":GOSUB10000
 679 IF X$="FALSE" THEN K=K+1:PRINT"⊐"
 680 PRINT"⊐":PRINT"MAGNETIC TAPE CAN RECORD LIGHT OR SOUND.":PRINT:GOSUB9999
 682 IFX$=""THENPRINT"⊐":GOTO680
 685 IFX$<>"TRUE"THENPRINT:PRINT"JUST THINK OF VIDEO RECORDERS!":GOSUB10000
 689 IF X$="TRUE" THEN K=K+1:PRINT"⊐"
 690 PRINT"⊐":PRINT"THE INVISIBLE SPECTRUM CAN'T BE SHOWN":PRINT
 691 PRINT"ON A SCREEN.":PRINT:GOSUB9999:PRINT:IFX$=""THENPRINT"⊐":GOTO690
 695 IFX$<>"FALSE"THENPRINT"WHAT ABOUT RADAR THEN?":GOSUB10000
 699 IF X$ ="FALSE" THEN K=K+1:PRINT"⊐"
 700 PRINT"⊐":PRINT"INFRARED RAYS CAN BE SENSED AT NIGHT.":PRINT:GOSUB9999:PRINT
 702 IFX$=""THENPRINT"⊐":GOTO700
 705 IFX$<>"TRUE"THEN PRINT"THE ANSWER SHOULD HAVE BEEN TRUE.":GOSUB10000
 709 IF X$="TRUE" THEN K=K+1:PRINT"⊐"
 710 PRINT"⊐":PRINT"THERE ARE TWO TYPES OF SPECTRUM.":PRINT:GOSUB9999:PRINT
 711 IFX$=""THENPRINT"⊐":GOTO710
 715 IFX$<>"TRUE"THENPRINT"THEY ARE THE VISIBLE ANS THE INVISIBLE.":GOSUB10000
 719 IF X$="TRUE" THEN K=K+1:PRINT"⊐"
 722 IF K<8 GOTO 725
 723 IF K>10 - K<14 GOTO 740
 724 IF K>14 GOTO 750
 725 PRINT"⊐":PRINT"YOU DIDN'T DO SO HOT "A$",I'M SURE THAT":PRINT
 726 PRINT"YOU WILL DO BETTER NEXT TIME.":PRINT
 727 PRINT"YOUR SCORE IS":PRINTK:PRINT"OUT OF 15.":GOSUB10000:GOTO800
 730 PRINT"THAT WAS GOOD "A$ ",YOUR SCORE IS":PRINT K:PRINT"OUT OF 15."
 731 GOSUB 10000:GOTO 800
 740 PRINT"THAT WAS VERY GOOD "A$",YOUR SCORE IS ":PRINT K:PRINT"OUT OF 15!"
 741 GOSUB 10000:GOTO 800
 750 PRINT"THAT WAS EXCELLENT "A$",YOUR SCORE WAS":PRINT K:PRINT"OUT OF 15!"
 751 GOSUB 10000:800
 800 POKE 216,10:PRINT:POKE198,6:PRINT"THAT'S ALL FOR TODAY "A$"."
 810 POKE 216,12:PRINT:POKE198,10:PRINT"SEE YOU TOMORROW.":GOSUB10000:
 812 PRINT"⊐":END
9999 OPEN1,0:INPUT#1,X$:PRINT:CLOSE1:RETURN
10000 POKE216,23:PRINT:POKE198,6
10001 PRINT"PRESS SPACE BAR TO CONTINUE"
10002 GET X$:IF X$="" THEN 10002
10004 IF X$=" "THEN PRINT"⊐":RETURN
10005 GOTO10000
```

```
READY.

 5 POKE144,88:POKE59468,12:REM BETA 1
 6 REM COPYRIGHT BRIAN BURKE 1983
 10 PRINT"Ɔ":PRINT"HELLO,IT'S NICE TO SEE YOU. HOWEVER,":PRINT
 20 PRINT"SINCE I HAVE BEEN SHUT DOWN I HAVE LOST":PRINT
 30 PRINT"YOUR NAME. PLEASE TYPE IT IN AGAIN.":PRINT:INPUT A$:PRINT
 40 PRINT"THANK YOU, "A$".":PRINT
 60 PRINT"TODAY YOU WILL NEED A PENCIL OR PEN":PRINT
 70 PRINT"AND MAYBE AN ERASER TOO.":PRINT
 80 PRINT"DO YOU HAVE YOURS":PRINT:INPUT X$:PRINT
 90 IF X$="YES"THEN PRINT"GOOD! LET'S GO TO WORK.":GOSUB10000:GOTO110
 100 IFX$<>"YES"THEN PRINT"SEE IF YOU CAN GET THEM.":GOSUB10000
 110 PRINT"TODAY WE WILL FIND OUT HOW THE LANDSATS":PRINT
 120 PRINT"ACTUALLY WORK. WE WILL DISCOVER HOW THEY"
 130 PRINT"SENSE RADIATION FROM THE EARTH AND HOW":PRINT
 140 PRINT"THEY MAKE THIS INFORMATION AVAILABLE":PRINT
 150 PRINT"TO SCIENTISTS AND STUDENTS.":GOSUB10000
 160 PRINT"BEFORE WE START, LET'S REVIEW THE MOST":PRINT
 170 PRINT"IMPORTANT POINTS FROM THE LAST LESSON.":PRINT
 180 PRINT"REMOTE SENSING NEEDS NO CONTACT.":PRINT
 190 PRINT"THE SATELLITE SENSES LIGHT AND INFRARED":PRINT
 200 PRINT"ENERGY.":PRINT
 210 PRINT"IT CHANGES THEM TO AN ELECTRICAL IMPULSE"
 220 PRINT"AND SENDS IT TO EARTH AS A RADIO SIGNAL.":GOSUB 10000
 230 PRINT"THESE SIGNALS ARE STORED ON MAGNETIC":PRINT
 240 PRINT"TAPES FOR FUTURE USE.":PRINT
 250 PRINT"MAGNETIC TAPES CAN BE USED TO MAKE":PRINT
 260 PRINT"VISUAL IMAGES ON FILM OR VIDEO SCREENS.":PRINT
 270 PRINT"THESE IMAGES MAY BE IN COLOUR OR BLACK":PRINT
 280 PRINT"AND WHITE.":GOSUB 10000
 290 PRINT"ARE YOU STILL WITH ME, "A$:PRINT:INPUTX$:PRINT
 300 IFX$="YES" THEN 320
 310 IFX$<>"YES"THEN 330
 320 PRINT"THAT'S GREAT! NOW ON TO THE SATELLITES.":GOSUB10000:GOTO350
 330 PRINT"WELL,WHAT WILL YOU DO WHEN WE GO INTO":PRINT
 340 PRINT"SPACE,"A$"?":GOSUB10000
 350 PRINT"IN YOUR PACKAGE YOU WILL FIND A":PRINT
 360 PRINT"DIAGRAM  OF TWO  LANDSAT SATELLITES.":PRINT
 370 PRINT"ONE IS OF THE EARLY SERIES OF LANDSAT":PRINT
 380 PRINT"SATELLITES CALLED LANDSATS 1,2 AND 3.":PRINT
 385 PRINT"THE SECOND ONE IS OF THE LATEST LANDSAT":PRINT
 390 PRINT"THAT WAS LAUNCHED IN 1982.":GOSUB 10000
 400 PRINT"ON YOUR HANDOUTS YOU WILL FIND BLANKS":PRINT
 410 PRINT"IN THE DATA ABOUT THE SATELLITES.":PRINT
 420 PRINT"THE MISSING INFORMATION IS ON THE NEXT":PRINT
 425 PRINT"DISPLAY. FILL IN THESE BLANKS.":GOSUB10000
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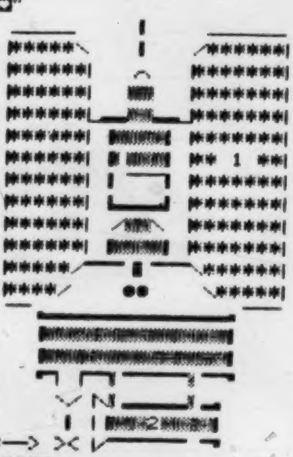

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READY.

 430 PRINT"Ɔ"
 431 PRINT" ______      |      _______   LANDSAT DATA"
 432 PRINT" |*****\     |     /******|   ─────────────── "
 433 PRINT" |******|    ⌒    |*******|   HEIGHT 3 M."
 434 PRINT" |******|    ▒▒   |*******|   DIAMETER 1.5M"
 435 PRINT" |******|___▒▒___|*******|   SOLAR PANELS"
 436 PRINT" |******|  ▒▒▒▒▒ |*******|   EXTEND TO 4M"
 437 PRINT" |******|  ▌▒▒▒▒ |** 1 **|   WEIGHT 815KG"
 438 PRINT" |******|  |‾‾‾| |*******|   ORBIT 900 KM"
 439 PRINT" |******|  |___| |*******|   #1 LAUNCHED "
 440 PRINT" |******|  /▒▒\  |*******|      23 JULY '72"
 441 PRINT" |******|  ▒▒▒▒▒ |*******|   SHUTDOWN JAN 78"
 442 PRINT" |*****/‾‾‾▮‾‾‾\******|   #2 LAUNCHED "
 443 PRINT" |****/    ●●    \*****|      21 JAN '75"
 444 PRINT" ‾‾  ━━━━━━━━━━━━━━━  ‾‾‾   SHUTDOWN FEB'82"
 445 PRINT"     ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒      #3 LAUNCHED"
 446 PRINT"     ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒         5 MARCH '78"
 447 PRINT"     ┐ ┌┐ ──────┐ ──      FROM 15 JULY'81"
 448 PRINT"      \/ N ____┘ _          TRANSMITS ON"
 449 PRINT"       | | ▒▒▒2▒▒▒          DEMAND ONLY."
 450 PRINT"3—> >< \/───── ┐            "
 451 GOSUB 10000
 455 PRINT"THERE WERE THREE NUMBERED ITEMS ON THE ";PRINT
 456 PRINT"LANDSAT DRAWING.";PRINT
 460 PRINT"I WANT TO SEE IF YOU CAN TELL ME WHAT";PRINT
 470 PRINT"THEY DO.";PRINT
 480 PRINT" #1 WAS THE SOLAR PANELS. WHAT DO THEY";PRINT
 490 PRINT"MAKE FROM THE SUNLIGHT FOR THE SATELLITE";PRINT;INPUTX$;PRINT
 500 IFX$="POWER" THEN 550
 510 IFX$="ELECTRICITY" THEN 550
 520 IFX$="ELECTRIC POWER"THEN 550
 530 IFX$<>"500TO520"THEN PRINT"I WAS HOPING YOU WOULD SAY";PRINT
 540 PRINT"ELECRTIC POWER OR ELECTRICITY.";GOSUB 10000;GOTO570
 550 PRINT"EXCELLENT! THIS UNIT SHOULD BE REALLY";PRINT
 551 PRINT"EASY FOR YOU, "A$".";GOSUB 10000
 570 PRINT"#3 IS AN ANTENNA. WHAT DO YOU THINK IT";PRINT
 580 PRINT"COULD BE USED FOR?     (ONE WORD ONLY)";PRINT;INPUTX$;PRINT
 590 IF X$="COMMUNICATION " THEN 650
 600 IFX$="RADIO"THEN 650
 610 IFX$="TELEMETRY"THEN650
 620 IFX$="DATA"THEN 650
 630 PRINT"I WAS SURE THAT YOU KNEW IT COULD BE ";PRINT
 640 PRINT"RADIO,COMMUNICATION,DATA OR TELEMETRY.";GOSUB 10000;GOTO660
 650 PRINT"YOU ARE REALLY GOOD, "A$" KEEP IT UP!";GOSUB 10000
 660 PRINT"#2 IS THE MULTISPECTRAL SCANNER.";PRINT
 670 PRINT"I KNOW WE HAVE NOT TALKED ABOUT IT ";PRINT
 680 PRINT"BEFORE, BUT WHAT DO YOU THINK IT MAY";PRINT
 690 PRINT"BE USED FOR? (NO MORE THAN TWO WORDS)";PRINT;INPUTX$;PRINT
 700 IF X$="REMOTE SENSING"THEN 750
 710 IF X$="SENSING RADIATION"THEN 750
 720 IFX$="INFRARED VISIBLE" THEN750
 730 IFX$="SCANNING"THEN750
 740 PRINT"THAT WAS A GOOD TRY, "A$".";PRINT
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```
READY.

 745 PRINT"THIS IS THE DEVICE FOR REMOTE SENSING.":GOSUB 10000:GOTO760
 750 PRINT"YOU ARE RIGHT ON TARGET, "A$".":GOSUB10000
 760 PRINT"NOW LET US TAKE A LOOK AT THE SECOND":PRINT
 770 PRINT"GENERATION OF LANDSAT SATELLITE,CALLED":PRINT
 780 PRINT"LANDSAT 4. THIS DIAGRAM ALSO REQUIRES":PRINT
 790 PRINT"YOU TO COPY DATA ABOUT THE LANDSAT 4":PRINT
 800 PRINT"FROM THE DIAGRAM SHOWN NEXT.":GOSUB 10000
 812 PRINT"     ▓ LANDSAT 4  SCHEMATIC DIAGRAM "
 813 PRINT"                   "
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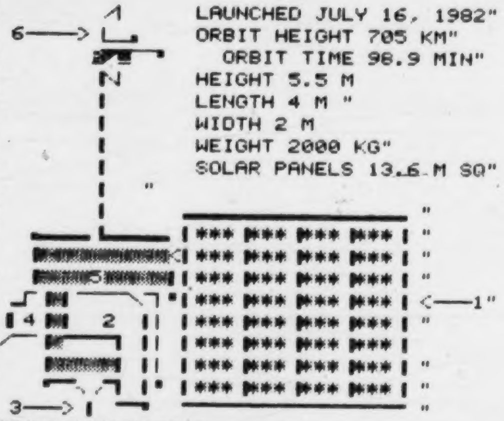

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 821 PRINT"         /|      LAUNCHED JULY 16, 1982"
 822 PRINT" 6———> L_.       ORBIT HEIGHT 705 KM"
 823 PRINT"        ▓▀▀━━•     ORBIT TIME 98.9 MIN"
 824 PRINT"        |\|      HEIGHT 5.5 M
 825 PRINT"        |        LENGTH 4 M "
 826 PRINT"        |        WIDTH 2 M
 827 PRINT"        |        WEIGHT 2000 KG"
 828 PRINT"        |        SOLAR PANELS 13.6 M SQ"
 829 PRINT"        |   "
 830 PRINT"        |       ________________ "
 831 PRINT"    ____ |______ |*** *** *** *** | "
 832 PRINT"    ▓▓▓▓▓▓▓▓▓▓▓▓<|*** *** *** *** | "
 833 PRINT"    ▓▓▓▓▓5▓▓▓▓▓▓|*** *** *** *** | "
 834 PRINT" _┌ ▓▓ ——\┐ •|*** *** *** *** | <——1"
 835 PRINT" | 4 ▓▓   2  || |*** *** *** *** | "
 836 PRINT"/—  ▓——┐  || |*** *** *** *** |
 837 PRINT"    ▓▓▓▓▓  || |*** *** *** *** | "
 838 PRINT"    ▀—\/┐  |• |*** *** *** *** | "
 839 PRINT" 3——> |  ━     ________________ "
 840 PRINT:PRINT:GOSUB10000
 850 PRINT"IF YOU LOOK CAREFULLY YOU WILL SEE THAT":PRINT
 860 PRINT"LANDSAT 4 HAS SOLAR PANELS #1,THE MSS":PRINT
 870 PRINT"- SHORT FOR MULTISPECTRAL SCANNER #2,AND"
 880 PRINT"A COMMUNICATIONS ANTENNA #3, JUST LIKE":PRINT
 890 PRINT"THE EARLIER LANDSAT SATELLITES.":GOSUB 10000
 900 PRINT"YOU WILL ALSO NOTICE SOME NEW EQUIPMENT":PRINT
 910 PRINT"SHOWN ON LANDSAT 4.":PRINT
 915 PRINT"THE THEMATIC MAPPER,TM FOR SHORT,IS #4.":PRINT
 920 PRINT"THIS IS A SECOND GENERATION SCANNING":PRINT
 930 PRINT"INSTRUMENT. INFORMATIOM SENT DOWN BY IT":PRINT
 940 PRINT"IS BEING STUDIED TO FIND THE BEST METHOD"
 950 PRINT"OF USE.":GOSUB 10000
 960 PRINT"THE SMALL REACTION MOTOR PACK IS MARKED":PRINT
 970 PRINT"#5. IT'S JOB IS TO KEEP THE LANDSAT":PRINT
 980 PRINT"IN THE CORRECT POSITION TO THE EARTH.":GOSUB10000
 990 PRINT"#6 IS THE TRACKING AND DATA RELAY":PRINT
1000 PRINT"SATELLITE SYSTEM ANTENNA.":PRINT
1010 PRINT"THIS RADIOS THE DATA DIRECTLY TO ANOTHER"
1020 PRINT"SATELLITE TO BE RELAYED TO EARTH WHEN":PRINT
1030 PRINT"THE LANDSAT 4 IS OUT OF RANGE.":GOSUB  10000
1040 PRINT"THE FIRST OF THESE RELAY SATELLITES WAS":PRINT
1050 PRINT"LAUNCHED FROM THE SECOND SPACE SHUTTLE,":PRINT
1060 PRINT"CHALLANGER, ON APRIL 5TH,1983 AND HAD":PRINT
1070 PRINT"SOME TROUBLE IN GETTING INTO THE PROPER":PRINT
1080 PRINT"ORBIT.":GOSUB 10000
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```
READY.

 1110 PRINT"THAT'S BEEN PRETTY HEAVY SO FAR. WOULD":PRINT
 1120 PRINT"YOU LIKE TO REVIEW THE IMPORTANT POINTS":PRINT
 1130 PRINT"BEFORE WE SEE HOW THE MSS WORKS.":PRINT
 1140 PRINT"ENTER R FOR REVIEW OR C TO CONTINUE.":PRINT:INPUTX$:PRINT
 1150 IFX$<>"R"THEN1480
 1155 PRINT"Ɔ":POKE198,10:PRINT" REVIEW #1 ":POKE198,9:PRINT"————————————":PRINT
 1160 PRINT"REMOTE SENSING WORKS WITHOUT CONTACT.":PRINT
 1170 PRINT"THE LANDSAT SENSES RADIATION ENERGY.":PRINT
 1180 PRINT"THIS ENERGY IS LIGHT AND INFRARED RAYS.":PRINT
 1190 PRINT"THESE ARE CONVERTED INTO ELECTRICAL":PRINT
 1200 PRINT"IMPULSES WHICH ARE SENT TO EARTH AS ":PRINT
 1210 PRINT"RADIO SIGNALS.":GOSUB 10000
 1220 PRINT"THE RADIO SIGNALS ARE RECORDED ON TAPE":PRINT
 1230 PRINT"BY THE GROUND STATIONS.":PRINT
 1240 PRINT"THESE MAGNETIC TAPES ARE STORED FOR":PRINT
 1250 PRINT"LATER USE.":GOSUB 10000
 1260 PRINT"THESE TAPES CAN BE USED TO MAKE VISUAL":PRINT
 1270 PRINT"IMAGES ON FILM OR VIDEO SCREENS.":PRINT
 1280 PRINT"THESE IMAGES MAY BE COLOURED OR BLACK":PRINT
 1290 PRINT"AND WHITE.":GOSUB10000
 1300 PRINT"THERE ARE TWO SERIES OF LANDSATS.":PRINT
 1310 PRINT"LANDSAT 1,2 AND 3 ARE THE FIRST SERIES.":PRINT
 1320 PRINT"LANDSAT 4 IS THE FIRST OF SERIES TWO.":PRINT
 1330 PRINT"ALL LANDSATS HAVE SOLAR PANELS.":PRINT
 1340 PRINT"RADIO ANTENNA ARE ALSO COMMON TO BOTH.":PRINT
 1350 PRINT"BOTH LANDSAT SERIES CARRY THE MSS OR":PRINT
 1360 PRINT"MULTISPECTRAL SCANNER.":GOSUB10000
 1370 PRINT"LANDSAT 4 HAS NEW EQUIPMENT ON BOARD.":PRINT
 1380 PRINT"THIS NEW EQUIPMENT IS VERY POWERFUL.":PRINT
 1390 PRINT"THE DATA FROM SOME OF THIS EQUIPMENT":PRINT
 1395 PRINT"IS NOT YET IN GENERAL USE.":GOSUB10000
 1400 PRINT"LANDSAT 4 DOES NOT STORE DATA. DATA IS ":PRINT
 1410 PRINT"TRANSMITTED DIRECTLY TO GROUND STATIONS":PRINT
 1420 PRINT"OR RELAYED THERE BY OTHER SATELLITES.":GOSUB 10000
 1430 PRINT"WELL HERE'S WHERE WE LOOK AT THE MMS.":PRINT
 1480 PRINT"Ɔ":PRINT"LET'S FIND OUT HOW THIS MSS WORKS.":PRINT
 1490 PRINT"THE MSS HAS THREE IMPORTANT PARTS FOR":PRINT
 1500 PRINT"OUR STUDY. THERE IS THE SCANNER SECTION":PRINT
 1510 PRINT"THE ELECTRONIC BAND SENSORS AND THE":PRINT
 1520 PRINT"DIGITAL DATA TRANSMISSION EQUIPMENT.":GOSUB 10000
 1530 PRINT"THE SCANNER SYSTEM HAS A MIRROR THAT":PRINT
 1540 PRINT"TURNS FROM SIDE TO SIDE. IN THIS WAY":PRINT
 1550 PRINT"REFLECTING PART OF THE RADIATION FROM":PRINT
 1560 PRINT"THE EARTH ONTO ELECTRONIC SENSORS.":GOSUB10000
 1570 PRINT"THE PART OF THE EARTH SEEN BY ONE SWING":PRINT
 1580 PRINT"OF THE MIRROR IS CALLED A SCAN LINE.":PRINT
 1590 PRINT"EACH SCAN LINE IS 185 KM WIDE. THERE ARE"
 1592 PRINT"2,340 SCAN LINES PER IMAGE WHICH COVERS":PRINT
 1594 PRINT"AN AREA 185 KM BY 185 KM OF THE EARTH":PRINT:PRINT
 1600 PRINT"THIS IS AN IMPORTANT POINT.":GOSUB 10000
 1610 PRINT"WHAT DO  WE CALL THE PART OF THE EARTH":PRINT
 1620 PRINT"SEEN IN ONE SWING OF THE MIRROR ON":PRINT
 1630 PRINT"THE MSS.":PRINT:INPUTX$:PRINT
```

```
READY.

1640 IFX$="SCAN LINE"THEN PRINT"WOW! YOU'RE ON THE BALL":GOSUB10000:GOTO1660
1650 IFX$<>"SCAN LINE"THEN PRINT"YOU'RE DREAMING. IT'S A SCAN LINE":GOSUB10000
1660 PRINT"WE KNOW THAT A MIRROR WILL REFLECT":PRINT
1670 PRINT"ALL THE LIGHT THAT SHINES ON IT.":PRINT
1680 PRINT"I WANT YOU TO THINK AND TELL ME HOW":PRINT
1690 PRINT"WE COULD SPLIT THIS LIGHT INTO THE":PRINT
1700 PRINT"COLOURS OF THE VISIBLE SPECTRUM.":PRINT
1710 PRINT"WHAT DEVICE WOULD WE USE? (ONE WORD)":PRINT:INPUTX$:PRINT
1720 IFX$="PRISM" THEN PRINT"I'M GLAD YOU REMEMBERED.":GOSUB10000:GOTO1740
1730 PRINT"THAT WAS NOT IT "A$"!":GOSUB10000
1740 PRINT"REMEMBER THAT A PRISM WILL SPLIT LIGHT":PRINT
1750 PRINT"INTO ITS SEPARATE COLOURS.":PRINT
1760 PRINT"AN ELECTRONIC SENSOR CAN ONLY SENSE":PRINT
1770 PRINT"EACH COLOUR SEPARATELY.":GOSUB10000
1780 PRINT"EACH BAND OF COLOUR CAN BE CALLED A":PRINT
1790 PRINT"SPECTRAL BAND.":PRINT
1800 PRINT"A SPECTRAL BAND IS A BAND OF LIGHT OF":PRINT
1810 PRINT"ONE COLOUR OR FREQUENCY.":GOSUB10000
1811 PRINT"WHAT DO WE CALL A BAND OF ONE COLOUR":PRINT
1812 PRINT"OF LIGHT":PRINT:INPUT X$:PRINT
1813 IFX$="SPECTRAL BAND"THEN 1819
1814 IF X$<>"SPECTRAL BAND" THEN 1815
1815 PRINT"YOU SHOULD HAVE REMEMBERED THAT IT WAS":PRINT
1816 PRINT"CALLED A SPECTRAL BAND.":GOSUB10000:GOTO1820
1819 PRINT"YOU'RE A GENIUS, "A$".":GOSUB10000
1820 PRINT"JUST AS WE HAVE VISIBLE AND INVISIBLE":PRINT
1830 PRINT"SPECTRUMS,THERE ARE VISIBLE AND":PRINT
1840 PRINT"INVISIBLE SPECTRAL BANDS.":GOSUB 10000
1841 PRINT"THE NUMBER OF SPECTRAL BAND TYPES ARE":PRINT:INPUTX$:PRINT
1842 IFX$="TWO"THENPRINT"RIGHT ON!":GOSUB10000:GOTO1850
1843 IFX$="2"THENPRINT"THAT'S RIGHT!":GOSUB10000:GOTO1850
1847 PRINT"YOU ARE NOT READING CAREFULLY, "A$".":PRINT
1848 PRINT"THAT SHOULD HAVE BEEN TWO TYPES. THE":PRINT
1849 PRINT"VISIBLE AND INVISIBLE SPECTRAL BANDS.":GOSUB10000
1850 PRINT"THE MSS ON THE LANDSAT 4 IS DESIGNED":PRINT
1860 PRINT"TO USE FOUR OF THESE BANDS OF LIGHT OR":PRINT
1870 PRINT"ENERGY FROM THE SPECTRUM.":PRINT
1880 PRINT"THERE ARE TWO BANDS OF COLOUR AND TWO":PRINT
```

```
READY.

 1890 PRINT"BANDS OF INVISIBLE INFRARED ENERGY.":GOSUB 10000
 1891 PRINT"HOW MANY SPECTRAL BANDS DOES THE MSS":PRINT
 1892 PRINT"SENSE? (USE WORDS)":PRINT:INPUTX$:PRINT
 1893 IFX$="FOUR"THEN 1898
 1897 PRINT"THERE ARE FOUR BANDS SENSED AT ONE TIME.":GOSUB10000:GOTO1900
 1898 PRINT"YOU'RE RIGHT AGAIN, "A$".":GOSUB10000
 1900 PRINT"THE BANDS OF COLOUR THAT ARE SENSED ARE":PRINT
 1910 PRINT"THE GREEN AND THE RED.":GOSUB10000
 1920 PRINT"THE INFRARED BANDS ARE THOSE WHICH ARE":PRINT
 1930 PRINT"USED IN INFRARED PHOTOGRAPHY. THESE ARE":PRINT
 1940 PRINT"SOMETIMES CALLED THE NEAR INFRARED AND":PRINT
 1950 PRINT"THE FAR INFRARED.":GOSUB 10000
 1960 PRINT"THESE BANDS HAVE BEEN GIVEN NUMBERS":PRINT
 1970 PRINT"TO IDENTIFY THEM IN THE DATA SENT DOWN.":PRINT
 1980 PRINT"BAND 1 IS THE GREEN BAND.":PRINT
 1990 PRINT"BAND 2 IS THE RED BAND.":PRINT
 2000 PRINT"BAND 3 IS THE NEAR INFRARED.":PRINT
 2010 PRINT"BAND 4 IS THE FAR INFRARED.":GOSUB10000
 2020 PRINT"WHEN THE SCAN LINE IS REFLECTED ONTO":PRINT
 2030 PRINT"THE ELECTRONIC SENSORS THEY REGISTER A":PRINT
 2040 PRINT"NUMBER VALUE FOR THE QUANTITY OF ENERGY":PRINT
 2050 PRINT"THAT FALLS ON THEM JUST AS THE LIGHT":PRINT
 2060 PRINT"METER DID. THEY RECORD 64 DIFFERENT":PRINT
 2070 PRINT"VALUES OF ENERGY.":GOSUB10000
 2080 PRINT"THESE NUMBERS ARE SENT TO EARTH AS A":PRINT
 2090 PRINT"CODED HIGH SPEED RADIO SIGNAL.":PRINT
 2100 PRINT"DATA MADE FROM THE NUMBER VALUES OF THE":PRINT
 2110 PRINT"ENERGY SENSED IS CALLED DIGITAL DATA.":PRINT
 2120 PRINT"THIS IS ANOTHER VERY IMPORTANT POINT.":GOSUB 10000
 2140 PRINT"WHAT IS IN THE HIGH SPEED RADIO SIGNAL":PRINT
 2142 PRINT"SENT BY LANDSAT TO GROUND STATIONS":PRINT:INPUTX$:PRINT
 2143 IFX$="DIGITAL DATA"THEN PRINT"EXCELLENT "A$" !":GOSUB 10000:GOTO2150
 2146 PRINT"YOU MUST PAY ATTENTION TO THE TERMS.":PRINT
 2147 PRINT"DIGITAL DATA IS IMPORTANT.":GOSUB10000
 2150 PRINT"LET'S TAKE A SHORT REVIEW OF THIS PART.":PRINT
 2151 PRINT"REFLECTED ENERGY FROM THE SCAN LINE":PRINT
 2153 PRINT"IS SPLIT INTO THE FOUR SPECTRAL BANDS":PRINT
 2155 PRINT"ON BOARD THE LANDSAT 4. IT IS THEN MADE":PRINT
 2157 PRINT"INTO DIGITAL DATA WHICH IS SENT EITHER":PRINT
 2159 PRINT"DIRECT TO THE GROUND STATION,OR RELAYED":PRINT
 2160 PRINT"THERE BY ANOTHER SATELLITE.":GOSUB10000
```

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READY.

 2170 PRINT" A SCHEMATIC DIAGRAM OF REMOTE SENSING":PRINT
 2175 PRINT" ┌─────────────────────┐"
 2180 PRINT" |     GREEN ..▄_<─────── BAND SENSORS "
 2190 PRINT" |               |     | "
 2200 PRINT" ├─  ╱ RED.....▄┘   ▬▬▬| "
 2210 PRINT" |╱─>            ├─ ▓▓▓─◥  DIGITAL DATA"
 2220 PRINT" |↑  ╲ NEAR IR.▄┘   ▀▀▀|  ◥ ← "
 2230 PRINT" |↑              |     |   ◥ RADIO BEAM"
 2240 PRINT" |↑    FAR IR..▄┘      | "
 2250 PRINT" └↑────────────────────┘    ◥  "
 2260 PRINT"  ▔          ↑               ◥ "
 2270 PRINT" ╱ ╲     LANDSAT 4 MSS        ◥ "
 2280 PRINT" ↑R↑                           ◡"
 2290 PRINT" ↑A↑                           ▌"
 2300 PRINT" ↑Y↑                         ┴─────"
 2310 PRINT" ↑S↑                         ╱╲────╲ "
 2320 PRINT" ↑╱╱                         └─┴───┘"
 2330 PRINT" ╱╱ "
 2340 PRINT" ▔"
 2350 PRINT" SCAN LINE               GROUND STATION":GOSUB 10000
 2355 POKE216,2:PRINT:POKE198,21:PRINT"◤"
 2362 POKE198,16:PRINT" ┌───┐ "
 2363 POKE198,16:PRINT"┴▒▒▒▒▒┴    ┌──────┐"
 2364 POKE198,16:PRINT"╱    ╲     | I'VE |"
 2365 POKE198,15:PRINT"╱       ╲  |  GOT  |"
 2366 POKE198,14:PRINT"◥ ▒▒▒▒▒▒▒ ◤ |  TO   |"
 2367 POKE198,15:PRINT"╲<▪  ▪>╱   |THINK! |"
 2368 POKE198,16:PRINT"╲    ╱    |      |"
 2369 POKE198,16:PRINT"( ╰──╯ )   ╱╱────────"
 2370 POKE198,17:PRINT"╲  ╱───────"
 2371 POKE198,18:PRINT"◤◥":DLOAD"BETA 2"
 10000 POKE 216,23:PRINT:POKE 198,6
 10001 PRINT"PRESS SPACE BAR TO CONTINUE"
 10003 GET X$:IF X$=""THEN 10003
 10004 IF X$=" "THEN PRINT"⊐":RETURN
 10005 GOTO10003
 10050 PRINT"⊐"
 10052 POKE216,4:PRINT:POKE198,10
 10055 PRINT"   ◤       "
 10060 PRINT"       ┌───┐         "
 10065 PRINT"       ┴▒▒▒▒▒▒┴  ┌───────┐  "
 10070 PRINT"    ___XXXXXX    |YOU'VE |  "
 10075 PRINT"       ╱    ╲    |       |  "
 10080 PRINT"      ╱      ╲   |  GOT  |  "
 10085 PRINT"     ◥ ▒▒▒▒▒▒ ◤  |       |  "
 10090 PRINT"      ╲<▪  ▪>╱   |  IT!  |  "
 10095 PRINT"       ╲    ╱    |       |  "
 10100 PRINT"       (╰──╯)   ╱╱────────  "
 10105 PRINT"        ╲ ╱──────           "
 10115 PRINT"         ◤◥"
 10120 PRINT"       ╱▔  ▔╲               "
 10125 PRINT"       |╲▒▒╱|               "
 10130 PRINT"        ┘  └                "
 10135 GOTO 10000
```

```
READY.

 10150 PRINT"J"
 10152 POKE216,4:PRINT:POKE198,10
 10155 PRINTTAB(10)"                              "
 10160 PRINTTAB(10)"                              "LIST10105
 10165 PRINTTAB(10)"                                  "
 10170 PRINTTAB(10)"                                  "
 10175 PRINTTAB(10)"                                  "
 10180 PRINTTAB(10)"                                 "
 10185 PRINTTAB(10)"                                  "
 10190 PRINTTAB(10)"                                  "
 10195 PRINTTAB(10)"                                  "
 10200 PRINTTAB(10)"                                  "
 10205 PRINTTAB(10)"                                  "
 10215 PRINTTAB(10)"                                  "
 10220 PRINTTAB(10)"                                  "
 10225 PRINTTAB(10)"                                  "
 10230 PRINTTAB(10)"                                  "
 10235 GOTO 10000
READY.
0:BETA2

READY.

 1 REM COPYRIGHT BRIAN BURKE I983
 5 POKE59468,12:POKE144,88:REM BETA 2
 10 PRINT:PRINT"THERE WAS NOTHING TO BE AFRAID OF.":PRINT
 20 PRINT"I JUST HAD AN ELECTRON COME LOOSE,BUT":PRINT
 30 PRINT"I'VE MANAGED TO FIX IT BACK IN PLACE.":PRINT
 40 PRINT"I TRUST THAT IT DID NO DAMAGE!":GOSUB10000
 50 PRINT"WHAT COLOUR IS SENSED IN BAND  2":PRINT:INPUTX$:PRINT
 55 IFX$="RED"THEN PRINT"THAT'S GREAT ●R▒.\┐╖X!":PRINT:GOTO65
 60 PRINT"THAT'S NOT RIGHT ●R▒.\┐╖X.":PRINT:GOTO65
 65 PRINT"OH!OH! I GUESS THAT ELECTRON WRECKED":PRINT
 70 PRINT"YOUR NAME IN MY MEMORY. ENTER IT PLEASE.":PRINT:INPUTA$:PRINT
 75 PRINT"THAT'S BETTER,I HOPE THAT NOTHING MORE":PRINT
 80 PRINT"WAS SCRAMBLED.":GOSUB 10000
 90 PRINT"YOU REMEMBER THAT THE LANDSAT SENSED ":PRINT
 100 PRINT"FOUR BANDS OF ENERGY. THESE WERE THE":PRINT
 110 PRINT"ONES THAT COULD BE OF MOST USE TO US.":PRINT
 120 PRINT"YOU SEE, EVERYTHING HAS ITS OWN WAY OF":PRINT
 130 PRINT"REFLECTING LIGHT OR ENERGY.":GOSUB10000
 140 PRINT"I WANT YOU TO THINK FOR A MOMENT.":PRINT
 150 PRINT"WHY IS IT COOL UNDER A TREE IN SUMMER?":PRINT:INPUTX$:PRINT
 160 PRINT"THAT WAS A GOOD TRY, "A$".":PRINT
 165 PRINT"THE REAL REASON IS THAT THE LEAVES ACT":PRINT
 170 PRINT"AS REFLECTORS OF THE INFRARED RAYS FROM":PRINT
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READY.

 180 PRINT"THE SUN AND SO PROTECT THE GROUND FROM":PRINT
 190 PRINT"HEAT RADIATED BY THE SUN.":GOSUB10000
 200 PRINT"WHICH TREE DO YOU THINK IS COOLER TO SIT"
 205 PRINT"UNDER IN SUMMER, AN EVERGREEN TREE OR A":PRINT
 207 PRINT"A BROADLEAF TREE":PRINT:INPUTX$:PRINT
 210 IFX$<>"BROADLEAF" THEN PRINT"SORRY IT'S THE BROADLEAF.":GOSUB10000:GOTO230
 220 IFX$="BROADLEAF"THEN PRINT "THAT WAS GOOD, "A$"!":GOSUB 10000
 230 PRINT"NOW IF YOU COULD SEE THE DIGITAL DATA":PRINT
 240 PRINT"BEING RECORDED ON LANDSAT 4, WHICH DO":PRINT
 250 PRINT"YOU THINK WOULD HAVE THE HIGHER NUMBER":PRINT
 260 PRINT"FOR REFLECTED INFRARED ENERGY THE":PRINT
 270 PRINT"EVERGREEN OR BROADLEAF TREE":PRINT:INPUTX$:PRINT
 275 IFX$<>"BROADLEAF"THEN PRINT"BROADLEAF IS CORRECT.TYPE IT IN.":PRINT:INPUTX$
 280 IFX$<>"BROADLEAF"THENPRINT"]":GOTO275
 290 IFX$="BROADLEAF"THEN:PRINT: GOTO300
 300 PRINT"]":PRINT"THAT'S EXACTLY WHAT HAPPENS!":GOSUB10000
 310 PRINT"THE BROADLEAF TREES REFLECT MOST OF THE":PRINT
 320 PRINT"INFRARED RAYS BECAUSE THE LEAVES LOWER":PRINT
 330 PRINT"DOWN REFLECT WHAT THE TOP LEAVES MISSED.":GOSUB10000
 340 PRINT"THE LEAVES OF TREES REFLECT THE INFRARED"
 350 PRINT"RAYS BECAUSE OF THE WAY THAT THE CELLS":PRINT
 360 PRINT"ARE ARRANGED INSIDE THE LEAF.":GOSUB 10000
 370 PRINT"WHAT DO YOU THINK WOULD HAPPEN TO THE":PRINT
 380 PRINT"QUANTITY OF INFRARED RAYS REFLECTED BY":PRINT
 390 PRINT"THE TREES IF THEY ARE ATTACKED BY SOME":PRINT
 400 PRINT"TYPE OF INSECTS OR DISEASE. WOULD THERE":PRINT
 410 PRINT"BE MORE OR LESS RADIATION":PRINT:INPUTX$:PRINT
 420 IFX$="LESS"THEN PRINT"THAT WAS VERY GOOD "A$"!":GOSUB 10000:GOTO440
 430 PRINT"I'M SORRY. THE ANSWER IS LESS.":GOSUB 10000
 440 PRINT"]":PRINT"WHEN THE CELLS OF THE LEAVES GET":PRINT
 450 PRINT"DAMAGED BY DISEASE, INSECTS OR LACK OF":PRINT
 460 PRINT"WATER THEY REFLECT LESS INFRARED RAYS.":GOSUB10000
 470 PRINT"THIS MAKES BAND 3 AND BAND 4, THE NEAR":PRINT
 480 PRINT"AND FAR INFRARED BANDS. VERY IMPORTANT":PRINT
 490 PRINT"FOR WATCHING THE FORESTS FOR DAMAGE OR":PRINT
 500 PRINT"DISEASE. THIS IS IMPORTANT FOR FORESTRY.":GOSUB 10000
 510 PRINT"THE INFRARED BANDS ARE ALSO IMPORTANT":PRINT
 520 PRINT"BECAUSE THEY ARE EASILY ABSORBED BY":PRINT
 530 PRINT"WATER. THIS HELPS US TO RECOGNIZE SUCH":PRINT
 540 PRINT"THINGS AS SLOUGHS AND SWAMPS FROM THE":PRINT
 550 PRINT"IMAGE MADE FROM THE DIGITAL DATA SENT":PRINT
 560 PRINT"BY LANDSAT.":GOSUB10000
 570 PRINT"WHAT IS MADE FROM THE DIGITAL DATA SENT":PRINT
 580 PRINT"BY LANDSAT.":PRINT:INPUTX$:PRINT
 590 IFX$="IMAGE" THEN PRINT"YOU ARE REALLY WITH IT TODAY.":GOSUB10000:GOTO610
 600 PRINT"IMAGES ARE MADE FROM THE DIGITAL DATA.":GOSUB10000
 610 PRINT"THEY MAKE THE IMAGES BY PASSING LIGHT":PRINT
 620 PRINT"THROUGH THE BLACK AND WHITE NEGATIVES,":PRINT
 630 PRINT"MADE BY THE COMPUTER, FROM THE DIGITAL":PRINT
 640 PRINT"DATA SENT DOWN BY LANDSAT.":GOSUB10000
 650 PRINT"WE HAVE NOT LOOKED AT THE GREEN OR RED":PRINT
 660 PRINT"SPECTRAL BANDS. EACH SPECTRAL BAND IS":PRINT
 670 PRINT"USEFUL FOR SENSING SOME FEATURES OF THE":PRINT
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READY.

 680 PRINT"SURFACE OF THE EARTH.";GOSUB10000
 690 PRINT"WHY DON'T I TELL YOU WHAT EACH BAND IS";PRINT
 700 PRINT"BEST FOR SENSING.";GOSUB 10000
 710 PRINT"BAND 1 GREEN - CITIES AND TOWNS";PRINT
 720 POKE198,15;PRINT"ROADS AND RAILROADS.";PRINT
 725 POKE198,15;PRINT"SEDIMENT IN WATER.";PRINT
 730 POKE198,15;PRINT"SURFACE FEATURES.";PRINT
 740 POKE198,15;PRINT"VEGETATION.";GOSUB10000
 750 PRINT"BAND 2 RED - MOST IMPORTANT FOR FINDING";PRINT
 760 POKE198,13;PRINT"DIFFERENT VEGETATION TYPES."
 770 POKE198,13;PRINT"SOME CULTURAL FEATURES.";GOSUB10000
 780 PRINT"BAND 3 NEAR INFRARED - CLEAR WATER.";PRINT
 790 POKE198,23;PRINT"EVERGREEN TREES.";PRINT
 800 POKE198,23;PRINT"DECIDUOUS TREES.";GOSUB10000
 810 PRINT"BAND 4 ";PRINT
 815 PRINT"FAR INFRARED - MOIST AREAS.";PRINT
 820 POKE198,15;PRINT"SLOUGHS.";PRINT
 830 POKE198,15;PRINT"SWAMPS.";PRINT
 840 POKE198,15;PRINT"INSECT DAMAGED TREES.";PRINT
 850 POKE198,15;PRINT"DISEASE DAMAGED TREES.";GOSUB10000
 860 PRINT"NOW THERE IS A PROBLEM. LET'S SEE HOW";PRINT
 870 PRINT"YOU WOULD SOLVE IT.";PRINT
 880 PRINT"FOUR BANDS OF DIGITAL DATA ARE SENT";PRINT
 890 PRINT"DOWN FROM LANDSAT 4. EACH ONE IS MADE";PRINT
 900 PRINT"INTO A BLACK AND WHITE NEGATIVE.";GOSUB10000
 910 PRINT"IN ORDER TO MAKE AN IMAGE YOU CAN SHINE";PRINT
 920 PRINT"A WHITE LIGHT THROUGH EACH NEGATIVE.";PRINT
 930 PRINT"THIS WOULD GIVE YOU A BLACK AND WHITE";PRINT
 940 PRINT"PHOTOGRAPH OF EACH SPECTRAL BAND.";GOSUB10000
 950 PRINT"IF YOU WANT TO MAKE A COLOURED IMAGE";PRINT
 960 PRINT"OF ALL THE BANDS, CAN YOU DO IT?";PRINT
 970 PRINT"REMEMBER THERE ARE ONLY THREE PRIMARY";PRINT
 980 PRINT"COLOURS. ANSWER YES OR NO";PRINT;INPUTX$;PRINT
 990 IFX$="NO"THENPRINT"THAT WAS EXCELLENT "A$"!";GOSUB10000:GOTO1010
 1000 PRINT"I'M AFRAID THAT'S AN IMPOSSIBLE TASK.";GOSUB10000
 1010 PRINT"THEY DO USE SINGLE SPECTRAL BAND IMAGES";PRINT
 1020 PRINT"FOR SOME SPECIAL TASKS. HOWEVER,THEY";PRINT
 1030 PRINT"MORE OFTEN USE A COLOUR COMPOSITE IMAGE.";GOSUB 10000
 1040 PRINT"A COLOUR COMPOSITE IMAGE IS MADE BY";PRINT
 1050 PRINT"PASSING A BEAM OF ONE PRIMARY COLOUR OF";PRINT
 1060 PRINT"LIGHT THROUGH ANY NEGATIVE. THIS IS";PRINT
 1070 PRINT"DONE TO THREE OF THE FOUR NEGATIVES.";PRINT
 1075 PRINT"EACH IS DONE WITH A SEPARATE COLOUR.";GOSUB10000
 1080 PRINT"THIS PRODUCES A COLOUR IMAGE THAT IS";PRINT
 1090 PRINT"UNLIKE WHAT YOU WOULD SEE IF YOU LOOKED";PRINT
 1100 PRINT"OUTSIDE. THESE ARE VERY USEFUL TOOLS TO";PRINT
 1110 PRINT"USE AT CERTAIN TIMES, SUCH AS MEASURING";PRINT
 1120 PRINT"FLOOD DAMAGE. IT ALL DEPENDS ON WHICH";PRINT
 1130 PRINT"BAND IS CODED WITH WHICH COLOUR.";GOSUB 10000
 1160 PRINT"THE MOST COMMON IMAGE IS COLOUR 1";PRINT
 1170 PRINT"THIS IS WHERE BAND 1 IS COLOURED BLUE.";PRINT
 1180 POKE198,14;PRINT"BAND 2 IS COLOURED GREEN.";PRINT
 1190 POKE198,14;PRINT"BAND 4 IS COLOURED RED.";PRINT;PRINT
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READY.

 1200 PRINT"THIS GIVES AN IMAGE WHERE THE TREES AND":PRINT
 1210 PRINT"OTHER VEGETATION APPEAR AS RED OR PINK.":PRINT
 1220 PRINT"THE WATER IS BLUE TO BLACK IF IT IS":PRINT
 1230 PRINT"CLEAR AND DEEP. IF THERE IS SEDIMENT":PRINT
 1240 PRINT"THEN IT WILL HAVE A LIGHT BLUE TINGE.":GOSUB10000
 1310 PRINT"TO MAKE A COLOUR COMPOSITE IMAGE THE":PRINT
 1320 PRINT"NEGATIVES OF THE THREE BANDS ARE PLACED":PRINT
 1330 PRINT"EXACTLY ONE OVER THE OTHER ON THE PAPER":PRINT
 1340 PRINT"USED TO MAKE THE PRINT. THEN THEY SHINE":PRINT
 1350 PRINT"THE BLUE,GREEN AND RED LIGHTS THROUGH":PRINT
 1360 PRINT"ALL THREE NEGATIVES FOR THE TIME THAT":PRINT
 1370 PRINT"IS NEEDED TO GET A GOOD IMAGE WITH THE":PRINT
 1380 PRINT"CORRECT BALANCE OF COLOURS.":GOSUB10000
 1390 PRINT"THERE, WE ARE FINISHED FOR TODAY.":PRINT
 1400 PRINT"I THINK WE NEED A REVIEW BEFORE I GIVE":PRINT
 1410 PRINT"YOU THE QUIZ FOR THIS UNIT.":DLOAD"BEQU"
10000 POKE 216,23:PRINT:POKE 198,6
10001 PRINT"PRESS SPACE BAR TO CONTINUE"
10003 GET X$:IF X$=""THEN 10003
10004 IF X$=" "THEN PRINT"❐":RETURN
10005 GOTO10003
10050 PRINT"❐"
10052 POKE216,4:PRINT:POKE198,10
10055 PRINT"   ◤       "
10060 PRINT"       ┌────┐        "
10065 PRINT"      _┴▁▁▁▁┴_   ┌──────┐  "
10070 PRINT"       XXXXXX    |YOU'VE|  "
10075 PRINT"       /    \    |      |  "
10080 PRINT"      /      \   |  GOT |  "
10085 PRINT"     ◥ ▁▁▁▁▁▁ ◤  |      |  "
10090 PRINT"     \<▪  ▪>/    |  IT! |  "
10095 PRINT"       \    /    |      |  "
10100 PRINT"       < ‿‿‿ >  //──────┘  "
10105 PRINT"        \  /─────          "
10115 PRINT"         ▀▀                "
10120 PRINT"       ╭─  ─╮              "
10125 PRINT"       |╲▁▁╱|              "
10130 PRINT"        ┘  └               "
10135 GOTO 10000
10150 PRINT"❐"
10152 POKE216,4:PRINT:POKE198,10
10155 PRINTTAB(10)"           ◤       "
10160 PRINTTAB(10)"    ┌─────┐        "
10165 PRINTTAB(10)"   _┴▁▁▁▁▁┴_             "
10170 PRINTTAB(10)"    XXXXXXXX   ┌──────┐  "
10175 PRINTTAB(10)"     /     \   |THAT'S|  "
10180 PRINTTAB(10)"    /       \  | NOT  | "
10185 PRINTTAB(10)"   ◥ ▁▁  ▁▁ ◤  |  IT  |  "
10190 PRINTTAB(10)"    \> ▪▼▪ </  └──────┘  "
10195 PRINTTAB(10)"     \  ◡  /  //         "
10200 PRINTTAB(10)"     <  ⌒  > //          "
10205 PRINTTAB(10)"      \ ◡ /─────         "
10215 PRINTTAB(10)"        ▀▀               "
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READY.

 10220 PRINTTAB(10)"           ╭‾  ‾╮                 "
 10225 PRINTTAB(10)"           |╲___╱ |               "
 10230 PRINTTAB(10)"            ┘  └                  "
 10235 GOTO 10000
READY.
0:BEQU

READY.

 5 POKE59468,12:POKE144,88:REMBEQU:REMCAPS:REMRUNKILL
 6 REM COPYRIGHT BRIAN BURKE 1983
 9 PRINT"⊐"
 10 POKE216,6:PRINT:POKE198,3:PRINT"THIS IS THE REVIEW FOR UNIT TWO.":GOSUB10000
 20 PRINT"THERE ARE TWO TYPES OF LANDSAT SATELLITE"
 30 PRINT"THE LANDSAT 4 WAS LAUNCHED 16 JULY 1982":PRINT
 40 PRINT"BOTH SERIES HAVE A MULTISPECTRAL SCANNER":GOSUB10000
 50 PRINT"THE MSS SCANS A LINE 185 KM LONG.":PRINT
 60 PRINT"THERE ARE 2340 SCANLINES IN EACH IMAGE.":PRINT
 70 PRINT"EACH IMAGE COVERS AN AREA 185 X 185 KM.":PRINT
 80 PRINT"THE IMAGES' SCALE IS 1 TO 1,000,000.":GOSUB10000
 90 PRINT"REFLECTED ENERGY FROM EARTH IS SENSED":PRINT
 100 PRINT"IN FOUR SPECTRAL BANDS.":PRINT
 110 PRINT"THE ENERGY SENSED IS MEASURED IN NUMBERS"
 120 PRINT"AND SENT TO EARTH AS DIGITAL DATA.":GOSUB10000
 130 PRINT"THE FOUR SPECTRAL BANDS ARE :-":PRINT
 131 PRINT"BAND 1 THE GREEN PART OF THE SPECTRUM.":PRINT
 132 PRINT"BAND 2 THE RED PART OF THE SPECTRUM.":PRINT
 133 PRINT"BAND 3 THE NEAR INFRARED (INVISIBLE).":PRINT
 134 PRINT"BAND 4 THE FAR INFRARED (INVISIBLE).":GOSUB10000
 140 PRINT"THE DIGITAL DATA IS MADE INTO NEGATIVES":PRINT
 150 PRINT"BY A MACHINE ON EARTH.":PRINT
 160 PRINT"ANOTHER MACHINE MAKES BLACK AND WHITE":PRINT
 170 PRINT"OR COLOURED IMAGES FORM THESE NEGATIVES.":GOSUB10000
 180 PRINT"THE COLOURED IMAGE IS SOMETIMES CALLED":PRINT
 190 PRINT"A FALSE COLOUR INFRERED IMAGE.":GOSUB10000
 195 PRINT"WE ARE USING A COLOUR ONE IMAGE.":PRINT
 200 PRINT"IN COLOUR ONE  THE COLOURS ARE CHANGED":PRINT
 210 PRINT"BAND 1 GREEN IS PRINTED IN BLUE":PRINT
 220 PRINT"BAND 2 RED IS PRINTED IN GREEN":PRINT
 230 PRINT"BAND 4 FAR INFRARED IS PRINTED IN RED":PRINT:PRINT
 240 PRINT"REMEMBER ANY BAND CAN BE PRINTED IN ANY":PRINT
 250 PRINT"OF THE PRIMARY COLOURS OR BAND 3 MAY BE":PRINT
 260 PRINT"PRINTED IN RED IN PLACE OF BAND 4.":GOSUB10000
 270 PRINT"EVERGREENS REFLECT LESS INFRARED RAYS":PRINT
 280 PRINT"THAN BROADLEAF TREES.":PRINT
 290 PRINT"IN COLOUR 1 IMAGES VEGETATION IS RED.":GOSUB10000
 300 PRINT"TREES THAT ARE DAMAGED BY INSECTS OR":PRINT
 310 PRINT"DISEASE REFLECT LESS INFRARED AND CAN":PRINT
 320 PRINT"BE DETECTED BY LANDSAT.":GOSUB10000
 330 PRINT"WATER THAT IS CLEAR AND DEEP WILL NOT":PRINT
 340 PRINT"REFLECT MUCH ENERGY TO THE SATELLITE":PRINT
 350 PRINT"AND SO APPEARS AS BLACK OR DARK BLUE.":GOSUB10000
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```
READY.

 370 PRINT"AS SAND THE WATER WILL APPEAR AS LIGHT":PRINT
 380 PRINT"BLUE IN THE COLOUR 1 IMAGE.":GOSUB10000
 390 PRINT"EACH BAND IS GOOD FOR CERTAIN FEATURES":PRINT
 400 PRINT"BAND 1 GREEN -CITIES AND TOWNS":PRINT
 410 POKE198,14:PRINT"ROADS AND RAILROADS.":PRINT
 415 POKE198,14:PRINT"SEDIMENT IN WATER.":PRINT
 420 POKE198,14:PRINT"SURFACE FEATURES.":PRINT
 430 POKE198,14:PRINT"VEGETATION.":GOSUB10000
 440 PRINT"BAND 2 RED - MOST IMPORTANT FOR FINDING":PRINT
 450 POKE198,13:PRINT"DIFFERENT VEGETATION TYPES."
 460 POKE198,13:PRINT"SOME CULTURAL FEATURES.":GOSUB10000
 470 PRINT"BAND 3 NEAR INFRARED - CLEAR WATER":PRINT
 480 POKE198,23:PRINT"EVERGREEN TREES.":PRINT
 490 POKE198,23:PRINT"DECIDUOUS TREES.":GOSUB10000
 500 PRINT"BAND 4 FAR INFRARED -":PRINT
 510 POKE198,20:PRINT"MOIST AREAS.":PRINT
 520 POKE198,20:PRINT"SLOUGHS.":PRINT
 530 POKE198,20:PRINT"SWAMPS.":PRINT
 540 POKE198,20:PRINT"INSECT DAMAGED TREES"
 550 POKE198,20:PRINT"DISESE DAMAGED TREES":GOSUB10000
 560 POKE216,6:PRINT:POKE198,10:PRINT"THAT WAS THE REVIEW.":PRINT
 570 POKE198,10:PRINT"NOW ON TO THE QUIZ.":GOSUB10000
 599 LETK=0
 600 PRINT"CHOOSE THE NUMBER THAT BEST ANSWERS THE":PRINT
 610 PRINT"QUESTION AND TYPE IT IN.":PRINT
 630 PRINT"THE MULTISPECTRAL SCANNER IS USED FOR:-":PRINT
 640 POKE198,5:PRINT"1. REMOTE SENSING.":PRINT
 650 POKE198,5:PRINT"2. REMOTE SCAMPERING.":PRINT
 660 POKE198,5:PRINT"3. REMOTE SCHEMING.":PRINT
 670 POKE198,5:PRINT"4. REMOTE SELLING.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO630
 680 IFX$="1"THENK=K+1:PRINT:PRINT"RIGHT ON!":GOSUB10000:PRINT"⊐":GOTO700
 685 IFX$<>"1"THENPRINT"⊐":PRINT"THE CORRECT ANSWER IS REMOTE SENSING."
 690 GOSUB10000:GOTO700
 700 PRINT"⊐":PRINT"THE LANDSAT SENSES THE COLOUR GREEN IN:-"
 710 POKE198,5:PRINT"1.  BAND ONE.":PRINT
 720 POKE198,5:PRINT"2.  BAND TWO.":PRINT
 730 POKE198,5:PRINT"3.  BAND THREE.":PRINT
 740 POKE198,5:PRINT"4.  BAND FOUR.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO700
 750 IFX$<>"1"THENPRINT"GREEN IS SENSED IN BAND 1.":GOSUB10000:PRINT"⊐":GOTO770
 760 IFX$="1"THENPRINT"THAT'S GREAT!":K=K+1:GOSUB10000:PRINT"⊐"
 770 PRINT"DIGITAL DATA IS USED TO MAKE:-":PRINT
 780 POKE198,5:PRINT"1.  PHOTOGRAPHS.":PRINT
 790 POKE198,5:PRINT"2.  PHONOGRAPHS.":PRINT
 800 POKE198,5:PRINT"3.  NEGATIVES.":PRINT
 810 POKE198,5:PRINT"4.  NUTRIENTS.":GOSUB9999:IFX$=""THEN PRINT"⊐":GOTO770
 820 IFX$="3"THEN PRINT"THAT'S CORRECT.":K=K+1:GOSUB10000:PRINT"⊐":GOTO840
 830 IFX$<>"3"THENPRINT"SORRY IT WAS 3. NEGATIVES.":GOSUB10000:PRINT"⊐":GOTO840
 840 PRINT"ON AN IMAGE CLEAR DEEP WATER WILL LOOK:-":PRINT
 850 POKE198,5:PRINT"1. DEEP BROWN TO RED.":PRINT
 860 POKE198,5:PRINT"2. DEEP GREEN TO YELLOW.":PRINT
 870 POKE198,5:PRINT"3. DEEP RED TO MAGENTA.":PRINT
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READY.

 880 POKE198,5:PRINT"4. DEEP BLUE TO BLACK.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO8
40
 890 IFX$="4"THENPRINT"BINGO!":K=K+1:GOSUB10000:PRINT"⊐":GOTO1010
 1000 IFX$<>"4"THENPRINT"NUMBER 4 WAS CORRECT.":GOSUB10000:PRINT"⊐":GOTO1010
 1010 PRINT"A SPECTRAL BAND IS:-":PRINT
 1020 POKE198,5:PRINT"1. ONE BAND OF RADIATION.":PRINT
 1030 POKE198,5:PRINT"2. TWO BANDS OF RADIATION.":PRINT
 1040 POKE198,5:PRINT"3. THREE BANDS OF RADIATION.":PRINT
 1050 POKE198,5:PRINT"4. FOUR BANDS OF RADIATION.":GOSUB9999
 1055 IFX$=""THENPRINT"⊐":GOTO1010
 1060 IFX$="1"THENPRINT"THAT'S RIGHT.":K=K+1:GOSUB10000:PRINT"⊐":GOTO1080
 1070 IFX$<>"1"THENPRINT"SORRY IT'S #1.":GOSUB10000:PRINT"⊐":GOTO1080
 1080 PRINT"IN AN IMAGE WATER WITH SEDIMENT LOOKS:-":PRINT
 1090 POKE198,5:PRINT"1.  LIGHT RED.":PRINT
 1100 POKE198,5:PRINT"2.  LIGHT GREEN.":PRINT
 1110 POKE198,5:PRINT"3.  LIGHT BLUE.":PRINT
 1120 POKE198,5:PRINT"4.  LIGHT BULB.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO1080
 1130 IFX$="3"THENPRINT"YOU'VE GOT IT!":K=K+1:GOSUB10000:PRINT"⊐":GOTO1150
 1140 IFX$<>"3"THENPRINT"IT'S LIGHT BLUE.":GOSUB10000:PRINT"⊐":GOTO1150
 1150 PRINT"DATA FROM LANDSAT 4 IS SENT TO :-":PRINT
 1160 POKE198,5:PRINT"1.  ANOTHER SATELLITE.":PRINT
 1170 POKE198,5:PRINT"2.  GROUND STATIONS.":PRINT
 1180 POKE198,5:PRINT"3.  BOTH OF THE ABOVE.":PRINT
 1190 POKE198,5:PRINT"4.  NONE OF THE ABOVE.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO
1150
 1200 IFX$="3"THENK=K+1:PRINT"RIGHT ON!":GOSUB10000:PRINT"⊐":GOTO1220
 1210 IFX$<>"3"THENPRINT"IT'S SENT TO BOTH.":GOSUB10000:PRINT"⊐":GOTO1220
 1220 PRINT"BROADLEAF TREES REFLECT :-":PRINT
 1230 POKE198,5:PRINT"1.  INFRARED RAYS.":PRINT
 1240 POKE198,5:PRINT"2.  ULTRA VIOLET RAYS.":PRINT
 1250 POKE198,5:PRINT"3.  BLUE RAYS.":PRINT
 1260 POKE198,5:PRINT"4.  STING RAYS.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO1220
 1270 IFX$="1"THEN PRINT"YOU'RE GOOD!":K=K+1:GOSUB10000:PRINT"⊐":GOTO1290
 1280 IFX$<>"1"THENPRINT"IT'S #1 THIS TIME.":GOSUB10000:PRINT"⊐":GOTO1290
 1290 PRINT"THE DIGITAL DATA FROM LANDSAT 4 IS :-":PRINT
 1300 POKE198,5:PRINT"1. STORED ON BOARD.":PRINT
 1310 POKE198,5:PRINT"2. SENT AS RADIO SIGNAL.":PRINT
 1320 POKE198,5:PRINT"3. SENT AS A BEAM OF LIGHT.":PRINT
 1330 POKE198,5:PRINT"4. STORED OUTSIDE":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO1290
 1340 IFX$="2"THENK=K+1:PRINT"THAT'S IT!":GOSUB10000:PRINT"⊐":GOTO1360
 1350 IFX$<>"2"THENPRINT"OH! OH! IT'S #2.":GOSUB10000:PRINT"⊐":GOTO1360
 1360 PRINT"LOSS OF REFLECTION OF INFRARED RAYS":PRINT
 1370 PRINT"FROM TREES MAY BE CAUSED BY :-":PRINT
 1380 POKE198,5:PRINT"1.  DISEASE.":PRINT
 1390 POKE198,5:PRINT"2.  INSECTS.":PRINT
 1400 POKE198,5:PRINT"3.  LACK  OF WATER.":PRINT
 1410 POKE198,5:PRINT"4.  ALL OF THE ABOVE.":PRINT
 1420 POKE198,5:PRINT"5.  NONE OF THE ABOVE.":GOSUB9999
 1430 IFX$=""THENPRINT"⊐":GOTO1360
 1440 IFX$="4"THENK=K+1:PRINT"YOU'RE A GENIUS!":GOSUB10000:PRINT"⊐":GOTO1450
 1450 IFK>8GOTO1530
 1460 IFK>7 - K<9GOTO1520
 1470 IFK>5 - K<7GOTO1510
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READY.

 1480 IFK<5 GOTO 1490
 1490 PRINT"THAT WAS NOT BAD, BUT YOU COULD DO":PRINT
 1500 PRINT"BETTER. YOUR SCORE WAS ":PRINT:PRINT K:PRINT:PRINT"OUT OF 10."
 1505 GOSUB10000:PRINT"J":GOTO3000
 1510 PRINT"THAT WAS GOOD! YOUR SCORE IS":PRINT:PRINT K:PRINT:PRINT"OUT OF 10."
 1515 GOSUB10000:PRINT"J":GOTO3000
 1520 PRINT"YOU DID VERY WELL! YOU SCORED":PRINT:PRINTK:PRINT:PRINT"OUT OF 10."
 1525 GOSUB10000:PRINT"J":GOTO3000
 1530 PRINT"THAT WAS EXCELLENT! YOU SCORED":PRINT:PRINTK:PRINT:PRINT"OUT OF 10."
 1535 GOSUB10000:PRINT"J":GOTO3000
 3000 POKE216,10:PRINT:POKE198,6:PRINT"THAT'S ALL FOR TODAY."
 3010 POKE216,12:PRINT:POKE198,8:PRINT"SEE YOU TOMORROW."
 3020 END
 9999 PRINT:OPEN1,0:INPUT#1,X$:PRINT:CLOSE1:PRINT:RETURN
 10000 POKE 216,23:PRINT:POKE 198.6
 10001 PRINT"PRESS SPACE BAR TO CONTINUE"
 10003 GET X$:IF X$=""THEN 10003
 10004 IF X$=" "THEN PRINT"J":RETURN
 10005 GOTO10003
 10050 PRINT"J"
 10052 POKE216,4:PRINT:POKE198,10
 10055 PRINT"   ◤      "
 10060 PRINT"       ┌─────┐       "
 10065 PRINT"      ┴▬▬▬▬▬▬▬┴  ┌───────┐  "
 10070 PRINT"       XXXXXX    | YOU'VE |  "
 10075 PRINT"       /   \     |        |  "
 10080 PRINT"      /     \    |  GOT   |  "
 10085 PRINT"     ◣ ▬▬▬▬▬▬ ◥  |        |  "
 10090 PRINT"      \<. /.>/   |  IT!   |  "
 10095 PRINT"       \   /     |        |  "
 10100 PRINT"       ( ‿‿ )  //─────────  "
 10105 PRINT"        \ /─────            "
 10115 PRINT"         ▀▀                 "
 10120 PRINT"       ╭─  ─╮               "
 10125 PRINT"       |\▬▬/|               "
 10130 PRINT"        ┘  L                "
 10135 GOTO 10000
 10150 PRINT"J"
 10152 POKE216,4:PRINT:POKE198,10
 10155 PRINTTAB(10)"           ◤       "
 10160 PRINTTAB(10)"      ┌\───────┐   "
 10165 PRINTTAB(10)"     ┴▬▬▬▬▬▬▬▬┴          "
 10170 PRINTTAB(10)"     XXXXXXXX  ┌───────┐ "
 10175 PRINTTAB(10)"      /    \   | THAT'S | "
 10180 PRINTTAB(10)"     /      \  |  NOT   |"
 10185 PRINTTAB(10)"    ◣ ▬▬  ▬▬ ◥ |   IT   | "
 10190 PRINTTAB(10)"     \>.▼.</   |_______┘ "
 10195 PRINTTAB(10)"      \ ⌣ /   //         "
 10200 PRINTTAB(10)"      <  ∩ >  //         "
 10205 PRINTTAB(10)"       \∪/─────          "
 10215 PRINTTAB(10)"        ▀▀               "
 10220 PRINTTAB(10)"      ╭─  ─╮             "
 10225 PRINTTAB(10)"      |\▬▬/|             "
 10230 PRINTTAB(10)"       ┘  L   ":GOTO 100000
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READY.

 2 REM DELTA
 5 POKE59468,12:PRINT"J":POKE188,88:REM KILL STOP
 6 REM COPYRIGHT BRIAN BURKE 1983
 10 PRINT"WELL IT'S NOW YOUR THIRD LESSON. I HOPE":PRINT
 20 PRINT"THAT YOU  FEEL MORE RELAXED. TODAY WE":PRINT
 30 PRINT"ARE GOING TO GET DOWN TO USING LANDSAT":PRINT
 40 PRINT"IMAGES FOR SOME REMOTE SENSING.":GOSUB10000
 50 PRINT"REMEMBER REMOTE SENSING IS OBTAINING":PRINT
 55 PRINT"INFORMATION ABOUT AN OBJECT WITHOUT":PRINT
 57 PRINT"ACTUALLY HAVING TO TOUCH IT.":GOSUB10000
 60 PRINT"BEFORE WE BEGIN I NEED SOME FACTS FROM":PRINT
 70 PRINT"YOU. FIRST ENTER YOUR NAME.":PRINT:INPUTA$:PRINT
 80 PRINT"NOW ENTER THE DATE.":PRINT:INPUT X$:PRINT
 90 PRINT"THAT WAS NOT HARD, "A$".":GOSUB 10000
 100 PRINT"FOR THIS LESSON YOU WILL NEED:-":PRINT
 110 PRINT"THE SUMMMER IMAGE OF WINNIPEG, THE CLEAR"
 120 PRINT"GRID,THE MAGNIFYING GLASS AND THE ROAD":PRINT
 130 PRINT"MAP OF WINNIPEG. WOULD YOU TAKE THEM OUT"
 140 PRINT"OF THE KIT. PLACE THE CLEAR GRID OVER":PRINT
 150 PRINT"THE IMAGE SO THAT #1 IS AT THE TOP LEFT."
 160 PRINT"WHEN YOU WANT TO INFORM ME YOU'RE READY":PRINT
 170 PRINT"ENTER YOUR NAME AND PRESS RETURN.":PRINT:INPUTX$:PRINT
 180 IFX$=A$ THEN GOSUB10000:GOTO200
 190 IFX$<>"A$"THEN GOTO 170
 200 PRINT"J":PRINT"LAST TIME WE SAW HOW THEY MADE THE DATA":PRINT
 210 PRINT"INTO IMAGES. WE SAW THE BEST USE FOR":PRINT
 220 PRINT"EACH BAND. NOW WE CAN BEGIN USING THESE":PRINT
 230 PRINT"FACTS TO DO SOME TARGET IDENTIFICATION":PRINT
 240 PRINT"FOR OURSELVES.":GOSUB10000
 250 PRINT"THERE ARE TWO IMPORTANT POINTS TO KEEP":PRINT
 260 PRINT"IN MIND WHEN YOU ARE GETTING INFORMATION"
 270 PRINT"FROM AN IMAGE, THESE ARE:-":PRINT
 280 PRINT"1. THE TIME OF YEAR.":PRINT
 290 PRINT"2. THE COLOUR OF THE TARGET AREA.":GOSUB10000
 300 PRINT"THE TIME OF YEAR AFFECTS THE ACTIVITIES":PRINT
 310 PRINT"IN THE TARGET AREA, AND THE COLOUR HELPS"
 320 PRINT"YOU TO IDENTIFY THE TARGET.":GOSUB10000
 330 PRINT"NOW TAKE A LOOK AT THE WINNIPEG SUMMER":PRINT
 340 PRINT"IMAGE. FIRST LET US LOOK FOR A TARGET.":PRINT
 350 PRINT"FOR THIS FIRST ATTEMPT LET'S TRY FOR THE"
 360 PRINT"LARGEST AREA OF CLEAR DEEP WATER.":GOSUB 10000
 370 PRINT"REMEMBER IT'S SUMMER SO THERE IS NO ICE":PRINT
 380 PRINT"ON THE WATER. CLEAR DEEP WATER ABSORBS":PRINT
 390 PRINT"THE INFRARED RAYS AS WELL AS THE GREEN":PRINT
 400 PRINT"AND RED RAYS. WE WANT THE  LARGEST AREA":PRINT
 410 PRINT"THAT IS BLACK OR VERY DARK BLUE.":PRINT
 420 PRINT"CAN YOU FIND THIS ONE ":PRINT:INPUTX$:PRINT
 425 IF X$="YES"THEN PRINT"THAT WAS VERY GOOD.":GOSUB10000:GOTO430
 427 PRINT"TRY IN SQUARE #2.FOUND IT?":PRINT:INPUTX$:PRINT
 428 IF X$="YES"THEN PRINT"THAT'S BETTER ,"A$".":GOSUB10000:GOTO460
 429 GOTO 427
 430 PRINT"WHAT NUMBER SQUARE WAS IT LOCATED IN":PRINT
 435 PRINT"USE THE WORD PLEASE.":PRINT:INPUTX$:PRINT
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READY.

 438 IFX$="TWO"THEN PRINT"THAT'S ABSOLUTELY CORRECT, "A$".":GOSUB10000:GOTO460
 460 PRINT"NOW YOU WILL NOTICE THAT THERE IS SOME":PRINT
 470 PRINT"RED MIXED IN WITH THE BLACK AT THE":PRINT
 480 PRINT"SOUTH END OF THE LAKE.":PRINT
 485 PRINT"WHAT DO YOU THINK IT COULD BE?":PRINT
 490 PRINT"REMEMBER THAT INFRARED HAS BEEN COLOUR":PRINT
 500 PRINT"CODED RED FOR THIS IMAGE.":PRINT
 501 LETK=0
 502 LETK=K+1
 503 IFK=3THEN GOTO555
 510 PRINT"WHAT REFLECTS A LOT OF INFRARED RAYS?":PRINT
 520 PRINT"USE ONE WORD ONLY.":PRINT:INPUT X$:PRINT
 530 IFX$="VEGETATION"THEN PRINT"THAT WAS EXCELLENT.":GOSUB10000:GOTO560
 540 IFX$="TREES"THEN PRINT"VERY GOOD, "A$".":GOSUB10000:GOTO560
 550 IFX$="GRASS"THEN PRINT"GOOD WORK.":GOSUB10000:GOTO560
 551 PRINT"⊐":GOTO 502
 555 PRINT"VEGETATION IS THE CORRECT ANSWER.":PRINT
 556 PRINT"TYPE IN VEGETATION.":PRINT:INPUTX$:PRINT
 557 IFX$="VEGETATION"THEN GOSUB10000:GOTO 560
 558 GOTO556
 560 PRINT"NOW WE KNOW THAT WE HAVE VEGETATION IN":PRINT
 570 PRINT"THE WATER. WHAT NAME DO WE GIVE AN AREA":PRINT
 580 PRINT"OF WATER WITH VEGETATION GROWING IN IT":PRINT:INPUT X$:PRINT
 590 IF X$="MARSH"THEN PRINT"THAT WAS EXCELLENT!":GOSUB 10000:GOTO660
 600 GOTO610
 610 PRINT"TRY A WORD THAT STARTS WITH A 'M'":PRINT:INPUT Y$:PRINT
 620 IFY$="MARSH"THEN PRINT"I KNEW YOU'D GET IT.":GOSUB10000:GOTO660
 630 PRINT"IT STARTS WITH MA***":PRINT:INPUT S$:PRINT
 640 IFS$<>"MARSH" THEN PRINT "IT IS A MARSH.":GOSUB10000:GOTO660
 650 IFS$="MARSH" THEN PRINT"THAT'S GOOD, NOW WE CAN GO ON.":GOSUB10000
 660 PRINT"NOW LET'S SEE IF YOU CAN FIND A LARGE":PRINT
 670 PRINT"BODY OF WATER WITH SOME SEDIMENT IN IT.":PRINT
 680 PRINT"REMEMBER THAT IT WILL REFLECT THE GREEN":PRINT
 690 PRINT"TO THE LANDSAT. WHAT COLOUR WILL IT BE":PRINT
 700 PRINT"IN THE IMAGE.":PRINT:INPUTX$:PRINT
 702 IFX$="LIGHT BLUE"THEN PRINT"VERY GOOD.":GOSUB10000:GOTO720
 705 PRINT"IT WILL SHOW UP AS LIGHT BLUE IN THE":PRINT
 708 PRINT"LANDSAT IMAGE.":GOSUB10000:GOTO720
 720 PRINT"WHAT GRID IS IT IN - USE THE WORD.":PRINT:INPUT X$:PRINT
 725 IFX$="ONE"THEN PRINT"YOU'RE RIGHT ON THE MONEY!":GOSUB10000:GOTO730
 728 PRINT"LOOK FOR WATER WITH LIGHT BLUE IN IT.":PRINT:GOTO720
 730 PRINT"I WOULD LIKE YOU TO LOOK AT GRID #3.":PRINT
 740 PRINT"WHAT IS SHOWN AS DARK BLUE OR BLACK?":PRINT:PRINT"ONE WORD ONLY."
 750 :PRINT:INPUTX$:PRINT
 751 IFX$="WATER"THEN GOTO760
 754 IFX$="LAKE"THEN GOTO760
 756 PRINT"TRY AGAIN! IT'S USUALLY WET.":GOTO750
 760 PRINT"THAT WAS VERY GOOD.":GOSUB10000
 765 PRINT"WHAT WORDS WOULD YOU USE TO DESCRIBE THE"
 770 PRINT"WATER YOU FOUND IN GRID #3?":PRINT
 780 PRINT"CHOOSE THE BEST DESCRIPTION FROM THE":PRINT
 790 PRINT"LIST AND TYPE IN ITS NUMBER.":PRINT
 800 PRINT"1. CLEAR AND COOL.":PRINT
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READY.

 810 PRINT"2. COOL AND DEEP.";PRINT
 820 PRINT"3. CLEAR AND DEEP.";PRINT
 830 PRINT"4. DEEP AND COOL.";PRINT
 835 INPUTX$;PRINT
 840 IFX$="3"THEN PRINT"YOU'RE DOING GREAT!";GOSUB10000
 850 PRINT"TRY AGAIN. THAT WAS NOT RIGHT";GOTO835
 860 PRINT"REMEMBER THAT CLEAR WATER IS USUALLY";PRINT
 870 PRINT"SHOWN IN DARK BLUE OR BLACK.";PRINT
 880 PRINT"WHAT COLOUR IS WATER WITH SEDIMENT IN IT";PRINT:INPUTX$;PRINT
 885 IFX$="LIGHT BLUE"THEN PRINT"KEEP UP THE GOOD WORK, "A$"!";GOSUB10000:GOTO90
0
 890 PRINT"REMEMBER THAT IT IS LIGHT BLUE.";GOSUB10000
 900 PRINT"NOW LET'S SEE IF YOU CAN RECOGNIZE SOME";PRINT
 910 PRINT"OTHER FEATURES. WHAT DO YOU  THINK THE";PRINT
 920 PRINT"LARGE AREAS OF RED IN 3,6 AND 9 ARE?";PRINT
 930 PRINT"REMEMBER THEY ARE STRONG REFLECTORS OF";PRINT
 940 PRINT"THE INFRARED RAYS.";PRINT
 945 PRINT:INPUTX$;PRINT
 950 IFX$ ="VEGETATION"THENGOTO959
 951 IFX$="FORESTS"THENGOTO959
 952 IFX$="FOREST"THENGOTO959
 953 IFX$="TREES"THENGOTO959
 955 PRINT"THAT IS HOW REMOTE SENSING WORKS.";GOSUB10000:GOTO1000
 958 GOTO961
 959 PRINT"THAT WAS VERY GOOD, "A$"!";PRINT
 960 PRINT"THAT IS HOW REMOTE SENSING WORKS.";GOSUB10000:GOTO1000
 963 PRINT"HERE'S A HINT THEY GROW QUITE TALL";PRINT:INPUTX$;PRINT
 965 IFX$="VEGETATION"THENPRINT"GOOD SHOW!";GOSUB10000:GOTO1000
 966 IFX$="TREES"THENPRINT"GOOD SHOW.";GOSUB10000:GOTO1000
 967 IFX$="FORESTS"THEN PRINT"GOOD SHOW!";GOSUB10000:GOTO1000
 970 GOTO972
 972 PRINT"WHAT DO MONKEYS CLIMB";PRINT:INPUTX$;PRINT
 973 IFX$="TREES"THEN PRINT"I KNEW YOU'D GET IT.";GOSUB1000:GOTO1000
 980 PRINT"THE ANSWER IS TREES.TYPE IN TREES.";PRINT:INPUTX$;PRINT
 990 IF X$<>"TREES"THENPRINT"⊐";GOTO980
 995 IFX$="TREES"THEN GOSUB10000
 1000 PRINT"THOSE THREE FRAMES SHOW A LARGE AREA OF";PRINT
 1010 PRINT"TREES. WHAT WOULD WE CALL THAT";PRINT:INPUTX$;PRINT
 1015 IFX$="FOREST"THEN GOTO1022
 1016 IFX$="FORESTS" THEN GOTO1022
 1020 GOTO1026
 1022 PRINT"YOUR'E ON THE BALL!";GOSUB10000;GOTO1030
 1026 PRINT"I'M SURE YOU KNOW IT'S CALLED A FOREST.";GOSUB10000;GOTO1030
 1030 PRINT"IN THAT FOREST AREA ARE SOME PATCHES";PRINT
 1040 PRINT"OF A DARKER SHADE OF RED. I WONDER IF";PRINT
 1050 PRINT"YOU REMEMBER WHAT TYPE OF TREE SHOWS";PRINT
 1060 PRINT"UP AS DARK RED ON THE IMAGES.";PRINT
 1070 PRINT"REMEMBER TO USE THE GENERAL NAME OF";PRINT
 1080 PRINT"ALL THE TREES OF THIS TYPE.";PRINT:INPUTX$;PRINT
 1090 IFX$="EVERGREEN"THEN GOTO1100
 1095 IFX$<>"EVERGREEN EVERGREENS" THENGOSUB10150;GOTO1110
 1100 GOSUB10050
 1110 PRINT"REMEMBER THAT EVERGREEN TREES REFLECT";PRINT
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READY.

 1120 PRINT"LESS INFRARED AND SO SHOW UP DARKER ON":PRINT
 1130 PRINT"THE IMAGES THAN THE BROADLEAF TREES DO.":GOSUB10000
 1140 PRINT"NOW LET'S SHIFT TO FRAME #7. YOU WILL":PRINT
 1150 PRINT"NEED THE MAGNIFYING GLASS FOR THIS ONE.":PRINT
 1160 PRINT"YOU CAN SEE MANY LITTLE RECTANGLES":PRINT
 1170 PRINT"IN THAT AREA. CAN YOU TELL ME WHAT THE":PRINT
 1180 PRINT"PINK/RED ONES ARE? ONE WORD ONLY.":PRINT:INPUTX$:PRINT
 1190 IFX$="FARMS"THEN GOTO1199
 1191 IFX$="FIELDS"THEN GOTO1199
 1193 IFX$="CROPS"THENGOTO1199
 1195 PRINT"THEY ARE FARM FIELDS WITH SOME CROPS.":GOSUB10000:GOTO1200
 1199 PRINT"YOU'RE GETTING ALONG JUST GREAT!":GOSUB10000
 1200 PRINT"THERE ARE ALSO DARK RECTANGLES IN THIS":PRINT
 1210 PRINT"AREA. REMEMBER WHAT THE PINK ONES ":PRINT
 1220 PRINT"ARE AND ALSO THE TIME OF THE YEAR.":PRINT
 1230 PRINT"WHAT MIGHT THE FARMER HAVE DONE TO HIS":PRINT
 1240 PRINT"FIELDS. THINK ABOUT THIS FOR A MOMENT":PRINT
 1250 PRINT"AND YOU SHOULD BE ABLE TO TELL ME WHAT":PRINT
 1260 PRINT"THOSE DARK AREAS MIGHT BE. TWO WORDS.":PRINT:INPUTX$:PRINT
 1261 IFX$="BARE SOIL"THEN GOTO1268
 1262 IFX$="BARE FIELDS"THENGOTO2168
 1263 IFX$="HARVESTED FIELDS"THEN GOTO1268
 1264 IFX$="SUMMER FALLOW"THEN GOTO1268
 1265 PRINT"THEY ARE AREAS WITHOUT VEGETATION.":GOSUB10000:GOTO1270
 1268 PRINT"THAT WAS CORRECT. I'M AMAZED AT WHAT":PRINT
 1269 PRINT"YOU CAN DO, "A$"!":GOSUB10000
 1270 PRINT"ANY AREA OF BARE SOIL WILL HAVE VERY":PRINT
 1280 PRINT"LITTLE REFLECTION AND SO SHOW UP AS":PRINT
 1290 PRINT"BLACK. THIS MAKES IT HARD TO TELL THE":PRINT
 1300 PRINT"DIFFERENCE BETWEEN BARE SOIL AND WATER.":PRINT
 1310 PRINT"THE BEST WAY IS TO LOOK AT THE SHAPES.":PRINT
 1320 PRINT"THE FIELDS USUALLY HAVE STRAIGHT SIDES":PRINT
 1330 PRINT"AND WATER BODIES HAVE IRREGULAR SHAPES.":GOSUB 10000
 1340 PRINT"NOW I'M GOING TO LEAVE YOU ON YOUR OWN":PRINT
 1350 PRINT"FOR THIS ONE. TELL ME IN WHICH SQUARE":PRINT
 1360 PRINT"YOU WILL FIND THE CITY OF WINNIPEG.":PRINT
 1370 PRINT"USE THE NUMBER.":PRINT
 1371 LETK=0
 1372 LETK=K+1
 1373 PRINT:INPUTX:PRINT
 1374 IFK=3THEN PRINT:PRINT"TRY A NUMBER BETWEEN 1 AND 9.":GOTO1379
 1375 IFX=5THEN PRINT"THAT WAS EXCELLENT, "A$"!":GOSUB10000:GOTO1400
 1376 IFX<5 THEN PRINT:PRINT"TRY A HIGHER NUMBER.":GOTO1372
 1377 IFX>5THEN PRINT:PRINT"TRY A LOWER NUMBER.":GOTO1372
 1378 IFK=0THEN PRINT"THAT WAS EXCELLENT, "A$"!":GOSUB10000:GOTO1400
 1379 LETC=0
 1380 LETC=C+1
 1381 PRINT:INPUT Y
 1382 IFC=3THEN PRINT:PRINT"LOOK IN #5. DID YOU FIND IT?":PRINT:INPUTZ$:GOTO1388
 1383 IFY<5THENPRINT:PRINT"TRY A HIGHER NUMBER.":PRINT:GOTO1386
 1384 IFY>5 THEN PRINT:PRINT"TRY A LOWER NUMBER.":PRINT:GOTO1386
 1385 IFY=5THEN PRINT"THAT'S IT. YOU FOUND IT.":GOSUB10000:GOTO1400
 1386 PRINT"THE CITY HAS AN AQUA/BLUE COLOUR.":GOTO 1380
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READY.

 1387 IFC=3THEN PRINT:PRINT"TRY NUMBER FIVE. DID YOU FIND IT?":PRINT:INPUTZ$
 1390 IFZ$="YES"THEN PRINT:PRINT"IT WAS'NT SO HARD WAS IT?":GOSUB10000:GOTO1400
 1391 PRINT"⊐":PRINT"IT'S THE LIGHT BLUE IN THE TOP LEFT":PRINT
 1392 PRINT"QUARTER OF THE SQUARE. IT IS ON THE":PRINT
 1394 PRINT"RIVER THAT ENTERS THE LAKE,IN #2,FROM":PRINT
 1396 PRINT"THE SOUTH. FOLLOW THE RIVER FROM THE":PRINT
 1398 PRINT"LAKE AND YOU SHOULD FIND IT. GOT IT?":PRINT:INPUT Z$:GOTO1390
 1400 PRINT"WE HAVE ONE MORE TYPE OF TARGET FOR YOU":PRINT
 1410 PRINT"TO IDENTIFY. LOOK AT #1.":PRINT
 1420 PRINT"CAN YOU SEE A NUMBER OF STRAIGHT LINES":PRINT:INPUTX$:PRINT
 1430 IFX$="YES"THEN PRINT"I'M GLAD YOU FOUND THEM.":GOSUB10000:GOTO1450
 1440 IFX$<>"YES"THEN PRINT "USE THE MAGNIFYING GLASS. LOOK BETWEEN":PRINT
 1445 PRINT"THE THREE LAKES AND THE BIG LAKE.":PRINT:GOTO1420
 1450 PRINT"WHAT DO YOU THINK THEY MAY BE":PRINT
 1451 PRINT"USE ONLY ONE WORD.":PRINT:INPUTX$:PRINT
 1455 IF X$="ROADS"THEN GOTO1600
 1456 IFX$="HIGHWAYS"GOTO1600
 1457 IFX$="RAILROADS"THENGOTO1600
 1458 PRINT"CHECK THEM ON THE ROAD MAP.":PRINT
 1459 PRINT"WHAT ARE THEY?":PRINT:GOTO1451
 1600 PRINT"⊐":PRINT"I'M GLAD THAT YOU FOUND THEM. COULD YOU":PRINT
 1610 PRINT"SEE ANY DIFFERENCE BETWEEN THE ROADS OR":PRINT
 1620 PRINT"HIGHWAYS AND THE RAILROAD TRACKS.":PRINT
 1630 PRINT"WHY DO YOU THINK THEY LOOK ALIKE?":GOSUB10000
 1635 PRINT"CHOOSE THE BEST ANSWER FROM THIS LIST":PRINT
 1640 PRINT"AND TYPE IN THE NUMBER.":PRINT
 1642 PRINT"1. THEY ARE THE SAME WIDTH.":PRINT
 1643 PRINT"2. THEY ARE THE SAME LENGTH.":PRINT
 1645 PRINT"3. THEY ARE THE SAME COLOUR.":PRINT
 1647 PRINT"4. THEY ARE TOO SMALL.":PRINT
 1649 PRINT"5. THEY ARE TOO LARGE.":PRINT
 1650 INPUTX$
 1655 IF X<>4 THEN PRINT:PRINT"FROM THE HEIGHT OF THE SATELLITE IT'S":PRINT
 1656 PRINT"HARD TO TELL THE DIFFERENCE BECAUSE OF":PRINT
 1657 PRINT"THEIR SIZE.":GOSUB10000:GOTO1670
 1660 IFX$=4THEN PRINT"YOU ARE GETTING VERY GOOD AT THIS.":GOSUB10000
 1670 PRINT"THERE WE HAVE JUST FINISHED LOOKING AT":PRINT
 1680 PRINT"A NUMBER OF TARGETS ON THE SUMMER IMAGE."
 1690 PRINT"LET'S QUICKLY GO OVER WHAT THEY WERE":PRINT
 1700 PRINT"AND WHAT THEY LOOKED LIKE.":GOSUB10000
 1710 PRINT"CLEAR DEEP WATER - DARK BLUE TO BLACK.":PRINT
 1720 PRINT"SEDIMENTED WATER - LIGHT BLUE.":PRINT
 1730 PRINT"MARSH,SWAMPS - RED AND DARK BLUE MIXED.":GOSUB10000
 1740 PRINT"BROADLEAF TREES - BRIGHT RED.":PRINT
 1750 PRINT"EVERGREEN TREES - DULL RED TO MAGENTA.":PRINT
 1760 PRINT"VEGETATION CROPS        - RED.":PRINT
 1765 PRINT"CROPS READY FOR HARVEST - YELLOW.":PRINT
 1770 PRINT"CROPS BEING HARVESTED   - PINK.":GOSUB10000
 1780 PRINT"BARE SOIL     -  BLACK.":PRINT
 1790 PRINT"FALLOW FIELDS -  BLACK.":PRINT
 1800 PRINT"BARE ROCK     -  GREY.":GOSUB 10000
 1810 PRINT"TOWNS AND CITIES - AQUA/BLUE.":PRINT
 1820 PRINT"ROADS AND RAILROADS - WHITE TO YELLOW.":GOSUB 10000
```

```
READY.

 1830 PRINT"NOW I'M GOING TO ASK YOU TO PLAY THE":PRINT
 1840 PRINT"ROLE OF A DETECTIVE, "A$".":GOSUB10000
 1850 PRINT"HERE IS YOUR ONLY CLUE. IN THE EARLY":PRINT
 1860 PRINT"DAYS OF SETTLEMENT IN THE WINNIPEG AREA":PRINT
 1870 PRINT"THE FRENCH ARRIVED FIRST. THEIR FARMS,":PRINT
 1880 PRINT"ON THE RIVER BANKS,STRETCHED INLAND.THEY"
 1890 PRINT"WERE LONG AND NARROW. LATER WHEN THE":PRINT
 1900 PRINT"BRITISH SETTLERS CAME THEY MADE SQUARE":PRINT
 1910 PRINT"FIELDS NEAR THE RIVERS.":GOSUB10000READY.
 1920 PRINT"NOW TELL ME IN WHICH SQUARE WE CAN SEE":PRINT
 1930 PRINT"THE BEST EVIDENCE OF THE FRENCH PATTERN":PRINT
 1940 PRINT"OF SETTLEMENT.":PRINT
 1941 PRINT:INPUTX:PRINT
 1950 IFX=5 THEN PRINT"THAT WAS VERY GOOD, "A$".!":GOSUB10000:GOTO1980
 1955 IFX<> 5 THEN GOTO1960
 1960 PRINT"LOOK ALONG THE RIVER BANKS IN SQUARE 5.":GOSUB10000:GOTO1920
 1970 PRINT
 1980 PRINT"BEING ABLE TO FIND TARGETS ON LANDSAT":PRINT
 1990 PRINT"IMAGES IS FAIRLY DIFFICULT. IT MAY TAKE":PRINT
 2000 PRINT"A LOT OF PRACTICE. WOULD YOU LIKE TO GO":PRINT
 2010 PRINT"OVER THIS PART OF THE UNIT AGAIN?":GOSUB10000
 2020 PRINT"IF YOU WANT TO REPEAT ENTER R, IF YOU":PRINT
 2030 PRINT"WANT TO CONTINUE TO THE WINTER IMAGE":PRINT
 2040 PRINT"ENTER C.":PRINT:INPUT X$:PRINT
 2050 IFX$="R"THEN GOTO 10
 2060 IFX$="C" THEN GOTO2070
 2070 POKE216,6:PRINT:POKE198,10:PRINT"ONE MOMENT PLEASE,"
 2075 POKE216,8:PRINT:POKE198,8:PRINT"I NEED MY LONG JOHNS!"
 2080 DLOAD"EPSILON"
 10000 POKE 216,23:PRINT:POKE 198,6
 10001 PRINT"PRESS SPACE BAR TO CONTINUE"
 10002 FORI=1TO10:GETC$:NEXTI
 10003 GET X$:IF X$=""THEN 10003
 10004 IF X$=" "THEN PRINT"□":RETURN
 10005 GOTO10003
 10050 PRINT"□"
 10052 POKE216,4:PRINT:POKE198,10
 10055 PRINT"   ◤       "
 10060 PRINT"       ┌────┐        "
 10065 PRINT"      ▁▁▁▁▁▁▁▁▁  ┌───────┐  "
 10070 PRINT"       XXXXXX    │YOU'VE │  "
 10075 PRINT"       /    \    │       │  "
 10080 PRINT"      /       \  │  GOT  │  "
 10085 PRINT"     ◥ ▁▁▁▁▁▁ ◤  │       │  "
 10090 PRINT"     \<.   .>/   │  IT!  │  "
 10095 PRINT"       \     /   │       │  "
 10100 PRINT"       ( ╰──╯)  //────────  "
 10105 PRINT"        \  /─────           "
 10115 PRINT"         ◣◢                 "
 10120 PRINT"       ╭─  ─╮               "
 10125 PRINT"       |\__/|               "
 10130 PRINT"        ┘  └                "
 10135 GOTO 10000
```

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READY.

 10150 PRINT"J"
 10152 POKE216,4:PRINT:POKE198,10
 10155 PRINTTAB(10)"            ◤        "
 10160 PRINTTAB(10)"     ┌──────┐        "
 10165 PRINTTAB(10)"    ▁▁▁▁▁▁▁▁▁▁             "
 10170 PRINTTAB(10)"    XXXXXXXXX   ┌────────┐ "
 10175 PRINTTAB(10)"      /     \   | THAT'S | "
 10180 PRINTTAB(10)"    '/      \   |  NOT   |"
 10185 PRINTTAB(10)"    ◥ ▬▬ ▬▬  ◤  |   IT   | "
 10190 PRINTTAB(10)"    \⊃ ▪▼▪ ⊂/   |▁▁▁▁▁▁▁▁┘ "
 10195 PRINTTAB(10)"      \  ∪ /   //          "
 10200 PRINTTAB(10)"      <  ∩ >  //           "
 10205 PRINTTAB(10)"       \ ∪/‾‾‾‾‾           "
 10215 PRINTTAB(10)"        ▀▀                 "
 10220 PRINTTAB(10)"      ╭─  ─╮               "
 10225 PRINTTAB(10)"      |\▁▁/|               "
 10230 PRINTTAB(10)"    _  ┘  └                "
 10235 GOTO 10000
READY.
READY.

 2 REM EPSILON
 5 POKE59468,12:PRINT"⊐":POKE144,88:REM KILL STOP
 6 REM COPYRIGHT BRIAN BURKE 1983
 10 POKE216,8:PRINT:PRINT"WOULD YOU TAKE OUT THE WINNIPEG WINTER":PRINT
 20 PRINT"IMAGE AND PUT THE TRANSPARENCY OVER IT":PRINT
 30 PRINT"JUST AS YOU DID FOR THE SUMMER IMAGE.":PRINT:PRINT:
 40 PRINT"WHEN YOU ARE READY ENTER 'PET'.":PRINT:
 45 OPEN 1,0:INPUT#1,X$:PRINT:CLOSE 1
 50 IFX$="PET"THENPRINT"⊐":GOTO70
 60 IFX$<>"PET"THEN PRINT"⊐":GOTO40
 70 POKE216,8:PRINT:PRINT"JUST HANG ON WHILE I DRESS FOR THE COLD."
 80 FORJ=1TO2000:NEXTJ
 90 PRINT"⊐":GOTO 98
 98 PRINT"
 99 PRINT"
 100 PRINT"
 101 PRINT"
 102 PRINT"
 103 PRINT"
 104 PRINT"
 105 PRINT"
 106 PRINT"
 107 PRINT"
 108 PRINT"
 109 PRINT"
 110 PRINT"
 111 PRINT"
 112 PRINT"
 113 PRINT"
 114 PRINT"
 115 PRINT"
 116 PRINT"
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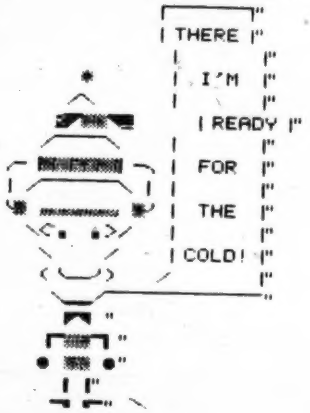

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 117 GOSUB10000
 118 PRINT"PLEASE ENTER YOUR NAME AGAIN.":PRINT
 119 OPEN1,0:INPUT#1,A$:PRINT:CLOSE 1:PRINT:GOSUB10000
 120 PRINT"DO YOU REMEMBER WHAT WE SAID ABOUT THE":PRINT
 125 PRINT"TIME OF THE YEAR BEING IMPORTANT IN":PRINT
 130 PRINT"REMOTE SENSING, "A$"?":PRINT
 132 PRINT"WELL, HERE IS HOW THIS KNOWLEDGE CAN BE":PRINT
 135 PRINT"PUT TO WORK. SCENES WHERE THERE IS":PRINT
 140 PRINT"LITTLE VEGETATION TO REFLECT THE GREEN":PRINT
 142 PRINT"PART OF THE VISIBLE SPECTRUM GENERALLY":PRINT
 145 PRINT"HAVE A BLUISH TINGE TO THEM. THIS IS":PRINT
 150 PRINT"QUITE NOTICEABLE ON THE WINTER IMAGE.":GOSUB10000
 160 PRINT"THE MONTH IS DECEMBER AND IT IS COLD.":PRINT
 170 PRINT"THAT MEANS THAT IT IS COLD ENOUGH FOR":PRINT
 180 PRINT"THERE TO BE SNOW ON THE GROUND. TAKE A":PRINT
 190 PRINT"LOOK AT THE IMAGE AND SEE IF YOU THINK":PRINT
 200 PRINT"THAT THERE IS SNOW ON THE GROUND?":PRINT
 210 OPEN1,0:INPUT#1,X$:PRINT:CLOSE 1:PRINT
 220 IF X$="YES"THEN PRINT"THAT'S VERY GOOD.":GOSUB10000:GOTO240
 230 IFX$<>"YES"THEN PRINT"TAKE A GOOD LOOK AT THE LAKE. DOES IT":PRINT
 235 PRINT"LOOK LIKE THE LAND? DOES THAT MEAN THAT":PRINT
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READY.

 238 PRINT"THE LAKE IS COVERED WITH ICE?":PRINT:GOTO210
 240 PRINT"NOW LET'S TAKE A CLOSE LOOK AT THE LAKE":PRINT
 250 PRINT"IN SQUARE #2. WHAT DO YOU THINK IS SHOWN"
 260 PRINT"BY THE BLACK LINE AWAY FROM THE  SHORE?":PRINT
 270 PRINT"IF YOU ARE NOT SURE WHERE THE LAKE IS":PRINT
 280 PRINT"THEN LOOK FOR IT IN THE SUMMER IMAGE.":PRINT
 290 OPEN1,0:INPUT#1,X$:PRINT:CLOSE 1:PRINT
 300 IF X$="WATER"THEN PRINT"RIGHT ON!":GOTO310
 301 IFX$<>"WATER"THEN PRINT"REMEMBER THAT CLEAR WATER SHOWED UP AS"
 302 PRINT:PRINT"BLACK IN THE SUMMER IMAGE.":GOTO310
 305 IFX$="OPEN WATER"THEN PRINT"YOU'RE DOING JUST FINE":GOTO310
 310 GOSUB10000
 330 PRINT"NOW IT'S TIME FOR YOU TO PLAY DETECTIVE":PRINT
 340 PRINT"ONCE AGAIN. LOOK AT SQUARES 3,6 AND 9":PRINT
 350 PRINT"WHAT DO YOU THINK THAT THE MAGENTA TO":PRINT
 360 PRINT"DARK RED IS? (USE THE GENERAL NAME.)":PRINT
 370 OPEN1,0:INPUTX$:PRINT:CLOSE1:PRINT
 380 IFX$="EVERGREEN EVERGREENS"THEN PRINT"THAT WAS EXCELLENT, "A$"!":GOTO399
 385 IFX$="TREES"THEN PRINT"THINK OF THE TYPE.":PRINT:GOTO370
 387 IFX$="EVERGREEN"THENPRINT"THAT WAS EXCELLENT, "A$"!":GOTO399
 389 IFX$="EVERGREENS"THENPRINT"THAT WAS EXCELLENT, "A$"!":GOTO399
 390 IFX$<>"EVERGREENS"THEN GOTO392
 391 IFX$="EVERGREEN"THENPRINT"THAT WAS EXCELLENT, "A$"!":GOTO392
 392 PRINT"HERE'S A HINT. WHAT DO YOU PUT GIFTS":PRINT
 393 PRINT"UNDER AT CHRISTMAS TIME? THINK OF THE":PRINT
 395 PRINT"GENERAL NAME FOR THAT TYPE OF TREE.":PRINT:GOTO370
 399 GOSUB10000
 400 PRINT"THOSE STANDS OF EVERGREENS ARE IN THE":PRINT
 410 PRINT"AGASSIZ PROVINCIAL FOREST. LOOK FOR IT":PRINT
 420 PRINT"ON THE ROAD MAP OF THE WINNIPEG AREA.":GOSUB10000
 430 PRINT"JUST AS A POINT OF INTEREST THE FOREST":PRINT
 440 PRINT"OUTLINES THE EASTERN SHORE OF THE OLD":PRINT
 450 PRINT"LAKE AGASSIZ. WINNIPEG IS LOCATED IN":PRINT
 460 PRINT"THE MIDDLE OF THIS ANCIENT LAKE BED.":GOSUB10000
 470 PRINT"NOW LOOK AT #5. CAN YOU FIND THE CITY":PRINT
 480 PRINT"OF WINNIPEG. WHAT DO YOU THINK THE ":PRINT
 490 PRINT"DARK RED IN THE SOUTH WEST OF THE CITY":PRINT
 500 PRINT"REPRESENTS? HERE'S A CLUE, IT'S LIKE":PRINT
 510 PRINT"A PLACE TO PLAY OR HAVE A PICNIC.":PRINT
 520 OPEN1,0:INPUT#1,X$:PRINT:CLOSE 1:PRINT
 525 IFX$<>"PARK"THEN PRINT"IT'S A PARK.":GOSUB10000:GOTO540
 530 IFX$="PARK"THEN PRINT"YOU ARE GETTING TO BE VERY GOOD AT THIS!":GOSUB10000
 540 PRINT"LOOK AT SQUARE_#8. WHAT DO YOU THINK":PRINT
 550 PRINT"THE LITTLE LINES THAT FORM THE SMALL":PRINT
 560 PRINT"SQUARES IN THE SNOW ARE?":PRINT
 570 OPEN1,0:INPUT#1,X$:PRINT:CLOSE 1:PRINT
 572 IFX$="ROADS"THEN GOTO 576
 573 IFX$<>"ROADS"THEN  GOTO575
 574 IFX$="ROADS"THEN GOTO 576
 575 PRINT"CARS USE THEM TO GO FROM PLACE TO PLACE.":GOTO577
 576 PRINT"YOU'RE NEARLY A PROFESSIONAL!":GOSUB10000:GOTO580
 577 FORJ=1TO2000:NEXTJ:PRINT"⊐":GOTO540
 580 PRINT"THERE WE HAVE REACHED THE END OF THIS":PRINT
```

```
READY.

 590 PRINT"COURSE. NOW WE'LL HAVE A SHORT REVIEW":PRINT
 600 PRINT"FOLLOWED BY A QUIZ.":GOSUB 10000
 601 PRINT"⊐":GOTO 602
 602 PRINT"
 603 PRINT"
 604 PRINT"
 605 PRINT"
 606 PRINT"
 607 PRINT"
 608 PRINT"
 609 PRINT"
 610 PRINT"
 611 PRINT"
 612 PRINT"
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 616 PRINT"
 617 PRINT"
 618 PRINT"
 619 PRINT"
 620 PRINT"
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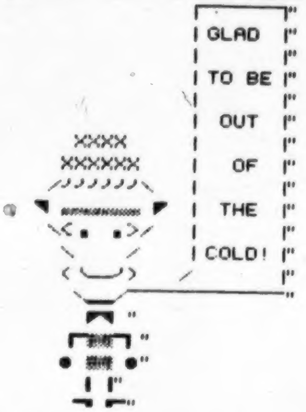

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 621 GOSUB10000
 630 PRINT"THIS REVIEW IS IMPORTANT AS IT WILL GO":PRINT
 640 PRINT"OVER THE MAJOR POINTS IN REMOTE SENSING."
 650 PRINT"IT WILL NOT DEAL WITH THE SATELLITES OR":PRINT
 660 PRINT"HOW THEY WORK. IT WILL COVER THE ACTUAL":PRINT
 670 PRINT"USE OF AN IMAGE TO GET INFORMATION.":GOSUB10000
 680 PRINT"IN THIS TYPE OF IMAGE DECIDUOUS TREES":PRINT
 690 PRINT"APPEAR AS A BRIGHT RED.":PRINT
 700 PRINT"EVERGREEN TREES ARE DEEP RED OR MAGENTA."
 710 PRINT"CROPS THAT ARE READY FOR HARVEST ARE":PRINT
 720 PRINT"USUALLY YELLOW.":PRINT
 730 PRINT"HEALTHY CROPS SHOW UP AS SHADES OF RED.":PRINT
 740 PRINT"CROPS WHERE THE HARVEST HAS STARTED LOOK"
 750 PRINT"PINK IN THE IMAGES.":GOSUB 10000
 760 PRINT"THE TIME OF THE YEAR HELPS US TO KNOW":PRINT
 770 PRINT"WHAT TO EXPECT FROM THE VEGETATION.IN A":PRINT
 780 PRINT"WINTER IMAGE THE TREES ARE USUALLY DARK":PRINT
 790 PRINT"RED OR MAGENTA BECAUSE THE BROADLEAF":PRINT
 800 PRINT"TREES HAVE SHED THEIR LEAVES.":GOSUB10000
 810 PRINT"WATER THAT IS CLEAR USUALLY IS SEEN AS":PRINT
 820 PRINT"DEEP BLUE TO BLACK.":PRINT
 830 PRINT"IF THERE IS ANYTHING FLOATING IN THE":PRINT
 840 PRINT"WATER THEN IT APPEARS TO BE LIGHT BLUE.":PRINT
 850 PRINT"THIS COULD BE ANYTHING FROM SAND TO SOME"
 860 PRINT"TYPE OF POLLUTION - NATURAL OR MAN MADE.":GOSUB10000
 870 PRINT"IN WINTER ICE ON THE WATER OR SNOW ON":PRINT
 880 PRINT"THE GROUND LOOKS BLUISH. IF THERE IS":PRINT
 890 PRINT"OPEN WATER IT WILL LOOK BLACK.":GOSUB10000
 900 PRINT"BARE FIELDS THAT HAVE BEEN LEFT WITHOUT":PRINT
 910 PRINT"CROPS FOR THE YEAR, TO REST THE SOIL":PRINT
 920 PRINT"WILL ALSO SHOW UP AS VERY DARK. IN ORDER"
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```
READY.

 930 PRINT"TO BE ABLE TO TELL THEM APART FROM WATER"
 940 PRINT"YOU NEED TO LOOK AT THEIR SHAPE.":GOSUB10000
 950 PRINT"MAN MADE OBJECTS SUCH AS TOWNS AND ":PRINT
 960 PRINT"CITIES WILL BE OF AN AQUA/BLUE COLOUR.":PRINT
 970 PRINT"ROADS AND RAILROADS WILL APPEAR AS ":PRINT
 980 PRINT"STRAIGHT LINES THAT ARE GREY TO WHITE.":GOSUB10000
 990 PRINT"IF THERE ARE CLOUDS IN THE IMAGE THEY":PRINT
 1000 PRINT"APPEAR AS WHITE WITH A DARK EDGE ON THE":PRINT
 1010 PRINT"NORTH SIDE. YOU HAVE TO TAKE CARE WITH":PRINT
 1020 PRINT"CLOUDS AS THEY CAN BE CONFUSED WITH":PRINT
 1030 PRINT"SNOW COVERED MOUNTAINS. HERE AGAIN YOU":PRINT
 1040 PRINT"MUST LOOK AT THE SHAPE AS WELL AS THE":PRINT
 1050 PRINT"COLOUR OF THE TARGET.":GOSUB10000
 1060 PRINT"THE SCALE OF THE IMAGE IS 1 TO 1000000":PRINT
 1070 PRINT"THAT MEANS THAT ONE CENTIMETER ON THE":PRINT
 1080 PRINT"IMAGE WOULD EQUAL TEN THOUSAND METRES":PRINT
 1090 PRINT"ON THE GROUND. THIS MEANS THAT SOMETHING":PRINT
 2000 PRINT"HAS TO BE QUITE LARGE IN ORDER FOR THE":PRINT
 2010 PRINT"SATELLITE TO BE ABLE TO SENSE IT.":PRINT
 2020 PRINT"THE LANDSAT 4 CAN SENSE SOMETHING THAT":PRINT
 2030 PRINT"IS 30M BY 30M.":GOSUB10000
 2050 PRINT"NOW HERE IS THE QUIZ ON THE WINNIPEG":PRINT
 2060 PRINT"AREA FOR BOTH THE SUMMER AND WINTER":PRINT
 2070 PRINT"IMAGES. YOU MAY KEEP THE IMAGES OUT IN":PRINT
 2080 PRINT"CASE YOU WANT TO REFER TO THEM.":GOSUB10000
 2090 PRINT"REMEMBER TO CHECK YOUR SPELLING ON THE":PRINT
 2100 PRINT"SCREEN BEFORE YOU PRESS THE RETURN.":PRINT
 2110 PRINT"ALSO DON'T FORGET TO USE THE CORRECT":PRINT
 2120 PRINT"WORD. DO NOT USE YES OR NO WHEN YOU ARE":PRINT
 2130 PRINT"ASKED TO TYPE IN TRUE OR FALSE.":PRINT
 2140 PRINT"GOOD LUCK ON THE QUIZ!":GOSUB10000
 2150 POKE216,10:PRINT:POKE198,6:PRINT"JUST A MOMENT, PLEASE."
 2160 DLOAD"DEEP"
 10000 POKE 216,23:PRINT:POKE 198,6
 10001 PRINT"PRESS SPACE BAR TO CONTINUE"
 10003 GET X$:IF X$=""THEN 10003
 10004 IF X$=" "THEN PRINT"J":RETURN
 10005 GOTO10003
 10050 PRINT"J"
 10052 POKE216,4:PRINT:POKE198,10
 10055 PRINT"    ◤ "
 10060 PRINT"                             "
 10065 PRINT"                                 "
 10070 PRINT"                                 "
 10075 PRINT"                                 "
 10080 PRINT"                                 "
 10085 PRINT"                                 "
 10090 PRINT"                                 "
 10095 PRINT"                                 "
 10100 PRINT"                                 "
 10105 PRINT"                                 "
 10115 PRINT"                                 "
 10120 PRINT"                                 "
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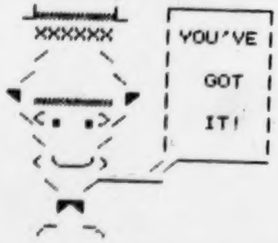

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READY.

 10125 PRINT"        |\___/ |                 "
 10130 PRINT"        ┘  └                     "
 10135 GOTO 10000
 10150 PRINT"⊐"
 10152 POKE216,4:PRINT:POKE198,10
 10155 PRINTTAB(10)"            ◤          "
 10160 PRINTTAB(10)"  ┌───────┐      "
 10165 PRINTTAB(10)" ┴───────┴                 "
 10170 PRINTTAB(10)" XXXXXXXX   ┌──────┐       "
 10175 PRINTTAB(10)"  /    \    | THAT'S |     "
 10180 PRINTTAB(10)" /      \   | NOT  | "
 10185 PRINTTAB(10)"◥ ▬   ▬ ◤  |  IT  |   "
 10190 PRINTTAB(10)" \_.▼._/   └──────┘       "
 10195 PRINTTAB(10)"  \ ◡ /  //                "
 10200 PRINTTAB(10)" (  ∩  ) //                "
 10205 PRINTTAB(10)"  \ ◡/ ───                 "
 10215 PRINTTAB(10)"    ▀                      "
 10220 PRINTTAB(10)"  ╭─  ─╮                   "
 10225 PRINTTAB(10)"  |\___/|                  "
 10230 PRINTTAB(10)"   ┘  └                    "
 10235 GOTO 10000
READY.
0:DEEP
READY.

 3 POKE59468,12:POKE144,88
 5 REM QUIZ FOR DELTA/EPSILON
 6 REM COPYRIGHT BRIAN BURKE 1983
 10 POKE216,4:PRINT:POKE198,6:PRINT"HERE WE GO FOR THE QUIZ.":PRINT
 20 PRINT"SINCE THIS HAS BEEN FAIRLY LONG I'LL BE":PRINT
 30 PRINT"SHORT WITH THIS QUIZ. REMEMBER TO WORK":PRINT
 40 PRINT"CAREFULLY AND WATCH YOUR SPELLING.":PRINT
 50 PRINTTAB(12)"GOOD LUCK!":GOSUB10000
 60 PRINT"PLEASE ENTER YOUR NAME.":PRINT:INPUTA$:PRINT
 70 PRINT"TYPE IN THE DATE.":PRINT:INPUTX$:GOSUB10000
 80 PRINT"TYPE IN THE NUMBER THAT BEST ANSWERS":PRINT
 90 PRINT"THE QUESTION.":PRINT
 99 LETK=0
 100 PRINT"IN A LANDSAT IMAGE HEALTHY VEGETATION":PRINT
 110 PRINT"SHOWS UP AS:-":PRINT
 120 PRINTTAB(10)"1. GREEN.":PRINT
 130 PRINTTAB(10)"2. BROWN.":PRINT
 140 PRINTTAB(10)"3. RED.":PRINT
 150 PRINTTAB(10)"4. BLUE.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO100
 160 IFX$="3"THEN PRINT"VERY WELL DONE.":K=K+1:GOSUB10000:GOTO180
 170 IFX$<>"3"THENPRINT"SORRY IT'S #3.":GOSUB10000:PRINT"⊐":GOTO180
 180 PRINT"THE IMAGE THAT YOU ARE EXAMINING HAS":PRINT
 190 PRINT"A LIGHT BLUE TINGE ALL OVER. THIS":PRINT
 200 PRINT"USUALLY INDICATES :-":PRINT
 210 PRINTTAB(10)"1. SNOW COVER.":PRINT
 220 PRINTTAB(10)"2. WATER BODIES.":PRINT
```

```
READY.

 230 PRINTTAB(10)"4. NONE OF THE ABOVE.":PRINT
 240 PRINTTAB(10)"5. ALL OF THE ABOVE.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO180
 250 IFX$="1"THENPRINT"THAT'S GREAT "A$"!":K=K+1:GOSUB10000:PRINT"⊐":GOTO270
 260 IFX$<>"1"THENPRINT"SORRY, IT'S SNOW COVER.":GOSUB10000:PRINT"⊐":GOTO270
 270 PRINT"THE IMAGE HAS SMALL PINK RECTANGLES.":PRINT
 280 PRINT"THESE WOULD INDICATE THAT :-":PRINT
 290 PRINTTAB(10)"1. THE GROUND IS WET.":PRINT
 300 PRINTTAB(10)"2. ALGAE IN THE WATER.":PRINT
 310 PRINTTAB(10)"3. HARVESTING HAS BEGUN.":PRINT
 320 PRINTTAB(10)"4. FALLOW FIELDS.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO270
 330 IFX$="3"THENPRINT"BINGO!":K=K+1:GOSUB10000:PRINT"⊐":GOTO350
 340 IFX$<>"3"THENPRINT"IT'S HARVEST TIME!":GOSUB10000:PRINT"⊐":GOTO350
 350 PRINT"A RECTANGULAR DARK BLUE TO BLACK AREA":PRINT
 360 PRINT"IN THE IMAGE.IT COULD BE :-":PRINT
 370 PRINTTAB(10)"1. EVERGREEN TREES.":PRINT
 380 PRINTTAB(10)"2. BROADLEAF TREES.":PRINT
 390 PRINTTAB(10)"3. CLEAR DEEP WATER.":PRINT
 400 PRINTTAB(10)"4. FALLOW FIELDS.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO350
 410 IFX$="4"THENPRINT"THAT'S IT!":K=K+1:GOSUB10000:PRINT"⊐":GOTO430
 420 IFX$<>"4"THENPRINT"IT WAS #4.":GOSUB10000:PRINT"⊐":GOTO430
 430 PRINT"THERE IS AN AREA OF MAGENTA IN THE ":PRINT
 440 PRINT"MIDDLE OF AN AREA OF BRIGHT RED.":PRINT
 450 PRINT"THE MAGENTA SHOWS AN AREA OF :-":PRINT
 460 PRINTTAB(10)"1. BROADLEAF TREES.":PRINT
 470 PRINTTAB(10)"2. EVERGREEN TREES.":PRINT
 480 PRINTTAB(10)"3. FAMILY TREES.":PRINT
 490 PRINTTAB(10)"4. DISEASED TREES.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO430
 500 IFX$="2"THENPRINT"THAT'S RIGHT ON!":K=K+1:GOSUB10000:PRINT"⊐":GOTO520
 510 IFX$<>"2"THENPRINT"IT WAS THE EVERGREENS.":GOSUB10000:PRINT"⊐":GOTO520
 520 PRINT"IN THE BLACK AREA OF AN IMAGE THERE IS":PRINT
 530 PRINT"AN AREA OF LIGHT BLUE. THIS LIGHT BLUE":PRINT
 540 PRINT"WOULD INDICATE SOME :-":PRINT
 550 PRINTTAB(10)"1. SEDITION.":PRINT
 560 PRINTTAB(10)"2. SEDIMENT.":PRINT
 570 PRINTTAB(10)"3. SEDATIVE.":PRINT
 580 PRINTTAB(10)"4. ALL OF THE ABOVE.":PRINT
 590 PRINTTAB(10)"5. NONE OF THE ABOVE.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO520
 600 IFX$="2"THENPRINT"YOU'RE VERY GOOD!":K=K+1:GOSUB10000:PRINT"⊐":GOTO620
 610 IFX$<>"2"THENPRINT"SORRY IT WAS #2.":GOSUB10000:PRINT"⊐":GOTO620
 620 PRINT"THE IMAGE IS ONE FOR JANUARY IT HAS AN":PRINT
 630 PRINT"OVERALL BLUISH TINGE. THERE IS AN AREA":PRINT
 640 PRINT"THAT IS NARROW AND BLACK IN THE LAKE.":PRINT:PRINT"THIS SHOWS :-":PRI
NT
 650 PRINTTAB(10)"1. COAL DEPOSITS.":PRINT
 660 PRINTTAB(10)"2. SEDIMENT.":PRINT
 670 PRINTTAB(10)"3. OPEN WATER.":PRINT
 680 PRINTTAB(10)"4. FALLOW FIELDS.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO620
 690 IFX$="3"THENPRINT"VERY GOOD!":K=K+1:GOSUB10000:PRINT"⊐":GOTO710
 700 IFX$<>"3"THENPRINT"THAT'S OPEN WATER.":GOSUB10000:PRINT"⊐":GOTO710
 710 PRINT"ON THE IMAGE THERE IS A STRAIGHT WHITE":PRINT
 720 PRINT"RUNNING THROUGH AN AREA OF RED. THIS":PRINT:PRINT"COULD BE :-":PRINT
 730 PRINTTAB(10)"1. A ROAD.":PRINT
 740 PRINTTAB(10)"2. A RAILROAD.":PRINT
```

```
READY.

 750 PRINTTAB(10)"3. A HIGHWAY.":PRINT
 760 PRINTTAB(10)"4. ALL OF THE ABOVE.":PRINT
 770 PRINTTAB(10)"5. NONE OF THE ABOVE.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO710
 780 IFX$="4"THENPRINT"BINGO!":K=K+1:GOSUB10000:PRINT"⊐":GOTO800
 790 IFX$<>"4"THENPRINT"IT'S ALL OF THEM.":GOSUB10000:PRINT"⊐":GOTO800
 800 PRINT"THERE IS AN AREA THAT IS RED AND BLACK":PRINT
 810 PRINT"MIXED. THIS IS AN AREA OF :-":PRINT
 820 PRINTTAB(10)"1. EVERGREEN TREES.":PRINT
 830 PRINTTAB(10)"2. BROADLEAF TREES.":PRINT
 840 PRINTTAB(10)"3. CLEAR DEEP WATER.":PRINT
 850 PRINTTAB(10)"4. MARSH.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO800
 860 IFX$="4"THENPRINT"YOU'RE A GENIUS!":K=K+1:GOSUB10000:PRINT"⊐":GOTO880
 870 IFX$<>"4"THENPRINT"IT'S A MARSH!":GOSUB10000:PRINT"⊐":GOTO880
 880 PRINT"THE IMAGE SHOWS AN AREA OF BRIGHT RED.":PRINT
 890 PRINT"THIS INDICATES AN AREA OF:-":PRINT
 900 PRINTTAB(10)"1. CLEAR DEEP WATER.":PRINT
 1000 PRINTTAB(10)"2. DISEASED VEGETATION.":PRINT
 1010 PRINTTAB(10)"3. SEDIMENTED WATER.":PRINT
 1020 PRINTTAB(10)"4. HEALTHY VEGETATION.":GOSUB9999:IFX$=""THENPRINT"⊐":GOTO880
 1030 IFX$="4"THENPRINT"THAT'S EXCELLENT!":K=K+1:GOSUB10000:PRINT"⊐":GOTO1050
 1040 IFX$<>"4"THEN PRINT"THE ANSWER IS #4.":GOSUB10000:PRINT"⊐":GOTO1050
 1050 IFK<5GOTO1120
 1060 IFK>5 - K<8GOTO1100
 1070 IFK>8GOTO1080
 1080 PRINT"THAT WAS EXCELLENT, "A$" YOU SCORED":PRINT:PRINTK:PRINT
 1090 PRINT"OUT OF 10.":GOSUB10000:GOTO2000
 1100 PRINT"THAT WAS VERY GOOD, "A$" YOUR SCORE IS":PRINT:PRINTK:PRINT
 1110 PRINT"OUT OF 10.":GOSUB10000:GOTO2000
 1120 PRINT"THAT WAS GOOD, "A$" YOU SCORED":PRINT:PRINTK:PRINT
 1130 PRINT"OUT OF 10.":GOSUB10000:GOTO2000
 2000 POKE216,8:PRINT:POKE198,5:PRINT"WELL THAT'S THE END OF THE PROGRAM.":PRINT
 2010 PRINT"         I HOPE THAT YOU ENJOYED IT!":GOSUB10000
 2050 PRINT"⊐"
 2051 POKE216,4:PRINT:POKE198,10
 2052 PRINT"   ◤       "
 2053 PRINT"      ┌──────┐ "
 2054 PRINT"     ─┴▬▬▬▬▬▬┴─"
 2056 PRINT"      ╱╯╯╯╯╲     ┌──────┐  "
 2057 PRINT"      /      \   |  GOOD |  "
 2058 PRINT"     ◥ ▬▬▬▬▬▬ ◤  |       |  "
 2059 PRINT"     \<■   ■>/   |  BYE! |  "
 2060 PRINT"       \    /    |       |  "
 2061 PRINT"       (╰──╯)  //───────  "
 2062 PRINT"        \  /────          "
 2063 PRINT"         ▀▀                "
 2064 PRINT"       ╭─  ─╮              "
 2065 PRINT"       |╲▬▬╱|              "
 2066 PRINT"        ┘  └               "
 2067 GOSUB 10000
 2068 PRINT"⊐"
 9999 PRINT:OPEN1,0:INPUT#1,X$:PRINT:CLOSE 1:PRINT:RETURN
 10000 POKE 216,23:PRINT:POKE 198,6
 10001 PRINT"PRESS SPACE BAR TO CONTINUE"
```

```
10002 FORI=1TO10:GETC$:NEXTI
10003 GET X$:IF X$=""THEN 10003
10004 IF X$=" "THEN PRINT"⊐":RETURN
10005 GOTO10003
10050 PRINT"⊐"
10052 POKE216,4:PRINT:POKE198,10
10055 PRINT"   ◤       "
10060 PRINT"       ┌────┐        "
10065 PRINT"    ─┴▒▒▒▒▒▒▒┴─ ┌───────┐  "
10070 PRINT"      ╯╯╯╯╯╯    │YOU'VE │  "
10075 PRINT"       /   \    │       │  "
10080 PRINT"      /      \  │  GOT  │  "
10085 PRINT"     ◥▒▒▒▒▒▒▒ ◤ │       │  "
10090 PRINT"     \<▪  ▪>/   │  IT!  │  "
10095 PRINT"      \    /    │       │  "
10100 PRINT"       <╰──╯>  //────────  "
10105 PRINT"       \  /──────          "
10115 PRINT"        ▛▜                 "
10120 PRINT"       ╭─  ─╮              "
10125 PRINT"       │\▒▒/│              "
10130 PRINT"        ┘ └                "
10135 GOTO 10000
10150 PRINT"⊐"
10152 POKE216,4:PRINT:POKE198,10
10155 PRINTTAB(10)"           ◤       "
10160 PRINTTAB(10)"     ┌────┐        "
10165 PRINTTAB(10)"   ─┴▒▒▒▒▒┴─            "
10170 PRINTTAB(10)"   XXXXXXXX   ┌───────┐ "
10175 PRINTTAB(10)"     /   \    │THAT'S │ "
10180 PRINTTAB(10)"   /       \  │ NOT   │ "
10185 PRINTTAB(10)"   ◥ ▒▒ ▒▒  ◤ │  IT   │ "
10190 PRINTTAB(10)"    \>▪▼▪</   │───────┘ "
10195 PRINTTAB(10)"    \  ◡  /   //        "
10200 PRINTTAB(10)"    <  ◠  >  //         "
10205 PRINTTAB(10)"      \◡/─────          "
10215 PRINTTAB(10)"       ▛▜               "
10220 PRINTTAB(10)"     ╭─  ─╮             "
10225 PRINTTAB(10)"     │\▒▒/│             "
10230 PRINTTAB(10)"      ┘ └               "
10235 GOTO 10000
READY.
READY.

 2 REM OMEGA AND FINAL REVIEW.
 3 REM COPYRIGHT BRIAN BURKE 1983
 5 POKE59468,12:POKE144,88:PRINT"⊐"
 10 PRINT"WELL,THIS IS THE LAST LESSON. BEFORE I":PRINT
 15 PRINT"FORGET,I NEED YOUR NAME.":PRINT:INPUTA$:PRINT
 20 PRINT"NOW,PLEASE ENTER THE DATE.":PRINT:GOSUB9999
 25 PRINT"⊐":GOTO30
 30 POKE198,6:PRINT"THIS IS THE FINAL REVIEW.":PRINT:PRINT
 35 PRINT"WE WILL GO OVER THE IMPORTANT POINTS":PRINT
 40 PRINT"BEFORE DOING A QUIZ ON THE WHOLE UNIT.":PRINT:PRINT
 45 PRINT"ANSWER THE QUESTIONS WITH TRUE OR FALSE.":GOSUB10000
 50 PRINT"REMOTE SENSING REQUIRES THAT CONTACT":PRINT
 60 PRINT"IS MADE WITH AN OBJECT IN ORDER TO GAIN":PRINT
 70 PRINT"INFORMATION ABOUT IT. TRUE OR FALSE?":PRINT:GOSUB9999
 72 IFX$<>"FALSE"THEN GOSUB10150:PRINT"⊐":GOTO50
 76 IFX$="FALSE"THENGOSUB10050:GOTO80
 80 PRINT"WE HAVE FIVE SENSES ONLY THREE ARE":PRINT
 90 PRINT"THOUGHT OF AS REMOTE SENSORS. THEY ARE":PRINT
 100 PRINT"SIGHT,SMELL AND HEARING. THE OTHERS NEED"
 110 PRINT"CONTACT TO WORK. TRUE OR FALSE?":PRINT:GOSUB9999
 120 IFX$="TRUE"THEN GOSUB10050:GOTO140
 130 IFX$<>"TRUE"THENGOSUB10150:PRINT"⊐":GOTO80
 140 PRINT"IN OUR STUDY REMOTE SENSING USES THE":PRINT
 150 PRINT"REFLECTED RADIATION FROM THE SUN.":PRINT
 155 PRINT"TRUE OR FALSE?":PRINT:GOSUB9999
 160 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO140
 170 IFX$="TRUE"THEN GOSUB10050:GOTO180
 180 PRINT"THERE ARE FOUR PRIMARY COLOURS OF LIGHT?":PRINT:GOSUB9999
 190 IFX$="FALSE"THEN GOSUB10050:GOTO210
 200 IFX$<>"FALSE"THENGOSUB10150:PRINT"⊐":GOTO180
 210 PRINT"THERE ARE TWO TYPES OF SPECTRUM, VISIBLE"
 220 PRINT"AND INVISIBLE. TRUE OR FALSE ?":PRINT:GOSUB9999
 230 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO210
 240 IFX$="TRUE"THEN GOSUB10050
 250 PRINT"THE STRENGTH OF LIGHT IS MEASURED BY A":PRINT
 260 PRINT"LIGHTMETER. TRUE OR FALSE?":PRINT:GOSUB9999
 270 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO250
 280 IFX$="TRUE"THEN GOSUB10050
 290 PRINT"IT IS POSSIBLE TO MEASURE ENERGY IN THE":PRINT
 300 PRINT"VISIBLE AS WELL AS THE INVISIBLE PARTS":PRINT
 310 PRINT"OF THE SPECTRUM. TRUE OR FALSE?":PRINT:GOSUB9999
 320 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO290
 330 IFX$="TRUE"THEN GOSUB10050
 340 PRINT"ELECTRICAL IMPULSES CAN BE STORED ON":PRINT
 350 PRINT"MAGNETIC TAPE. HOWEVER, THEY CAN NOT BE":PRINT
 360 PRINT"DISPLAYED ON A T.V. TYPE OF SCREEN.":PRINT
 370 PRINT"TRUE OR FALSE?":PRINT:GOSUB9999
 380 IFX$<>"FALSE"THEN GOSUB10150:PRINT"⊐":GOTO340
 390 IFX$="FALSE"THEN GOSUB10050
 400 PRINT"THE LANDSAT SATELLITE USES ONLY THE":PRINT
 410 PRINT"VISIBLE SPECTRUM FOR REMOTE SENSING.":PRINT
 420 PRINT"TRUE OR FALSE?":PRINT:GOSUB9999
 430 IFX$<>"FALSE"THEN GOSUB10150:PRINT"⊐":GOTO400
 440 IFX$="FALSE"THEN GOSUB10050
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```
READY.

 450 PRINT"FOR REMOTE SENSING THE LANDSAT SATELLITE"
 460 PRINT"USES THE MULTISPECTRAL SCANNER OR MSS.":PRINT
 470 PRINT"TRUE OR FALSE?":PRINT:GOSUB9999
 480 IFX$<>"TRUE"THENGOSUB10150:PRINT"⊐":GOTO450
 490 IFX$="TRUE"THEN GOSUB10050
 500 PRINT"THE MIRROR ON THE MSS HAS A SCAN LINE":PRINT
 510 PRINT"THAT IS 185 KM WIDE.":PRINT
 520 PRINT"TRUE OR FALSE?":PRINT:GOSUB9999
 530 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO500
 540 IFX$="TRUE"THENGOSUB10050
 550 PRINT"LANDSAT 4 IS THE FIRST OF THE SECOND":PRINT
 560 PRINT"SERIES OF LANDSAT SATELLITES. THIS ":PRINT
 570 PRINT"SATELLITE WAS LAUNCHED IN 1981.":PRINT
 575 PRINT"TRUE OR FALSE?":PRINT:GOSUB9999
 580 IFX$<>"FALSE"THEN GOSUB10150:PRINT"⊐":GOTO550
 590 IFX$="FALSE"THEN GOSUB10050
 600 PRINT"THE MSS ON LANDSAT 4 USES FOUR BANDS IN":PRINT
 610 PRINT"SCANNING THE EARTH. TWO OF THESE ARE":PRINT
 620 PRINT"LIGHT AND TWO ARE INVISIBLE INFRARED":PRINT
 630 PRINT"RAYS THAT CAN BE USED IN PHOTOGRAPHY.":GOSUB10000
 640 PRINT"WHEN THE NAME OF THE COLOUR OR INVISIBLE"
 650 PRINT"RADIATION APPEARS TYPE IN 'TRUE' IF IT":PRINT
 660 PRINT"IS USED IN REMOTE SENSING AND 'FALSE' IF"
 670 PRINT"IF IS NOT.":GOSUB10000
 680 PRINT"1. RED ?":PRINT:GOSUB9999
 690 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO680
 700 IFX$="TRUE"THEN GOSUB10050
 710 PRINT"2.BLUE ?":PRINT:GOSUB9999
 720 IFX$<>"FALSE"THENGOSUB10150:PRINT"⊐":GOTO710
 730 IFX$="FALSE"THEN GOSUB10050
 740 PRINT"3. ULTRA VIOLET ?":PRINT:GOSUB9999
 745 IFX$<>"FALSE"THEN GOSUB10150:PRINT"⊐":GOTO740
 750 IFX$="FALSE"THEN GOSUB10050
 760 PRINT"4. NEAR INFRARED ?":PRINT:GOSUB9999
 770 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO760
 780 IFX$="TRUE"THEN GOSUB10050
 790 PRINT"5. RADAR ?":PRINT:GOSUB9999
 800 IFX$<>"FALSE"THENGOSUB10150:PRINT"⊐":GOTO790
 810 IFX$="FALSE"THEN GOSUB10050
 820 PRINT"6. FAR INFRARED ?":PRINT:GOSUB9999
 830 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO820
 840 IFX$="TRUE"THENGOSUB10050
 860 PRINT"PHEW! I'M GETTING TIRED OF RUNNING ON":PRINT
 870 PRINT"AND OFF CAMERA. TO SAVE ME GETTING TOO":PRINT
 880 PRINT"TIRED I'M JUST GOING TO TELL YOU FACTS":PRINT
 890 PRINT"FOR A LITTLE WHILE.":GOSUB10000
 900 PRINT"THE MSS ON LANDSAT SENSES IN FOUR BANDS":PRINT
 1000 PRINT"OF THE SPECTRUM. THESE READINGS ARE":PRINT
 1010 PRINT"CHANGED TO NUMBERS AND SENT AS A HIGH":PRINT
 1020 PRINT"SPEED RADIO TRANSMISSION TO THE EARTH.":GOSUB10000
 1030 PRINT"THESE TRANSMISSIONS ARE RECORDED ON":PRINT
 1040 PRINT"MAGNETIC TAPE. SPECIAL MACHINES PRODUCE":PRINT
 1050 PRINT"BLACK AND WHITE NEGATIVES FROM THEM FOR":PRINT
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READY.

 1060 PRINT"EACH OF THE FOUR BANDS THAT WERE SENSED.":GOSUB10000
 1070 PRINT"THESE NEGATIVES ARE THEN PLACED INTO A":PRINT
 1080 PRINT"DIFFERENT MACHINE  ONE EXACTLY OVER THE":PRINT
 1090 PRINT"OTHER AND A PRINT IS MADE.":GOSUB10000
 1100 PRINT"IN THE SECOND MACHINE THE NEGATIVES ARE":PRINT
 1110 PRINT"EXPOSED TO BEAMS OF BLUE,GREEN AND RED":PRINT
 1120 PRINT"LIGHT, WHICH CREATES A COLOURED IMAGE":PRINT
 1130 PRINT"ON THE PHOTOGRAPHIC PAPER.":GOSUB 10000
 1150 PRINT"THE COLOURS OF OBJECTS IN THE IMAGE ARE":PRINT
 1160 PRINT"NOT THE SAME AS WE SEE IN REAL LIFE.":PRINT
 1170 PRINT"THIS IS WHY THE PHOTOGRAPHS ARE OFTEN":PRINT
 1180 PRINT"CALLED FALSE COLOUR INFRARED IMAGES.":GOSUB10000
 1190 PRINT"I'M RESTED A LITTLE SO LET'S GO BACK TO":PRINT
 1200 PRINT"THE TRUE AND FALSE FOR A WHILE.":PRINT
 1210 PRINT"ARE YOU READY? WELL HERE WE GO!":GOSUB10000
 1220 PRINT"THE RED IN THE LANDSAT IMAGE SHOWS ONLY":PRINT
 1230 PRINT"THE PART THAT REFLECTS INFRARED RAYS.":PRINT:GOSUB9999
 1240 IFX$<>"TRUE"THENGOSUB10150:PRINT"J":GOTO1220
 1250 IFX$="TRUE"THEN GOSUB10050
 1260 PRINT"THE GREEN IN THE IMAGE SHOWS THE AREA":PRINT
 1270 PRINT"THAT REFLECTED RED LIGHT.":PRINT:GOSUB9999
 1280 IFX$<>"TRUE"THEN GOSUB10150:PRINT"J":GOTO1260
 1290 IFX$="TRUE"THENGOSUB10050
 1300 PRINT"THE BLUE IN THE IMAGE SHOWS AREAS THAT":PRINT
 1310 PRINT"REFLECTED BLUE LIGHT.":PRINT:GOSUB9999
 1320 IFX$<>"FALSE"THENGOSUB10150:PRINT
 1330 PRINT:PRINT"THOSE AREAS REFLECT GREEN LIGHT.":GOSUB10000:GOTO1350
 1340 IFX$="FALSE"THENGOSUB10050
 1350 PRINT"THAT WAS PRETTY GOOD. NOW LET'S TRY SOME"
 1360 PRINT"GROUND TARGETS TO SEE HOW YOU DO.":GOSUB10000
 1370 PRINT"CLEAR DEEP WATER WILL SHOW UP AS":PRINT
 1380 PRINT"LIGHT BLUE IN THE IMAGE.":PRINT:GOSUB9999
 1390 IFX$="FALSE"THEN GOSUB10050:GOTO1420
 1400 IFX$<>"FALSE"THEN GOSUB10150:GOTO1410
 1410 PRINT:PRINT"CLEAR DEEP WATER IS DARK BLUE TO BLACK.":GOSUB10000:GOTO1420
 1420 PRINT"LIGHT BLUE IN THE IMAGE SHOWS WATER WITH"
 1430 PRINT"SOME SEDIMENT IN IT.":PRINT:GOSUB9999
 1440 IFX$<>"TRUE"THENGOSUB10150:PRINT"J":GOTO1420
 1450 IFX$="TRUE"THENGOSUB10050
 1460 PRINT"THAT TAKES CARE OF THE WATER PART OF OUR"
 1470 PRINT"REVIEW. LET'S LOOK AT PLANT LIFE NOW.":GOSUB10000
 1480 PRINT"HEALTHY BROADLEAF TREES WILL SHOW UP AS":PRINT
 1490 PRINT"BRIGHT GREEN ON THE IMAGES.":PRINT:GOSUB9999
 1495 IFX$="FALSE"THEN GOSUB10050:GOTO1560
 1500 IFX$<>"FALSE"THENGOSUB10150:PRINT"J"
 1510 PRINT"REMEMBER THAT VEGETATION IS A STRONG":PRINT
 1520 PRINT"REFLECTOR OF INFRARED RAYS. THESE RAYS":PRINT
 1530 PRINT"ARE COLOURED RED IN THE IMAGES, SO THE":PRINT
 1540 PRINT"ANSWER SHOULD HAVE BEEN FALSE.":GOSUB10000:GOTO1560
 1560 PRINT"EVERGREEN OR NEEDLELEAF TREES WILL BE":PRINT
 1570 PRINT"SHOWN AS MAGENTA TO DARK RED IN AN IMAGE":PRINT:GOSUB9999
 1580 IFX$<>"TRUE"THENGOSUB10150:PRINT"J":GOTO1560
 1590 IFX$="TRUE"THEN GOSUB10050
 1600 PRINT"PINK CAN SHOW AREAS WHERE HARVESTING":PRINT
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READY.

 1610 PRINT"HAS BEGUN.":PRINT:GOSUB9999ADY.
 1620 IFX$<>"TRUE"THEN GOSUB10150PRINT"⊐":GOTO1600
 1630 IFX$="TRUE"THEN GOSUB10050
 1640 PRINT"FIELDS THAT WERE PLOUGHED UP FOR THE":PRINT
 1650 PRINT"SEASON MAY ALSO SHOW UP BLACK OR DARK":PRINT
 1660 PRINT"BLUE. WE CAN USUALLY TELL THESE FIELDS":PRINT
 1670 PRINT"APART FROM WATER BY THEIR SHAPES.":PRINT:GOSUB9999
 1680 IFX$<>"TRUE"THENGOSUB10150:PRINT"⊐":GOTO1640
 1690 IFX$="TRUE"THEN GOSUB10050
 1700 PRINT"CROPS THAT ARE READY FOR HARVEST LOOK":PRINT
 1710 PRINT"YELLOW IN THE IMAGES DUE TO THE LOSS":PRINT
 1720 PRINT"OF SOME OF THE CHLOROPHYLL IN THE PLANT."
 1730 PRINT"ANSWER TRUE OF FALSE.":PRINT:GOSUB9999
 1740 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO1700
 1750 IFX$="TRUE"THEN GOSUB10050
 1760 PRINT"AREAS OF WHITE,IN A SUMMER IMAGE,COULD":PRINT
 1770 PRINT"BE WHERE THE CROP HAS BEEN HARVESTED.":PRINT
 1780 PRINT"WHITE PATCHES THAT APPEAR LARGER THAN":PRINT
 1790 PRINT"OTHER FIELDS, ABOUT 1.6MM,ARE THE SIZE":PRINT
 1800 PRINT"OF A SECTION OF LAND, AND ARE PASTURES.":PRINT
 1810 PRINT"TRUE OR FALSE.":PRINT:GOSUB9999
 1820 IFX$<>"TRUE"THENGOSUB10150:PRINT"⊐":GOTO1760
 1830 IFX$="TRUE"THEN GOSUB10050
 1840 PRINT"IN A WINTER IMAGE THE WHITE COULD BE AN":PRINT
 1850 PRINT"AREA OF SNOW. THERE ARE OTHER THINGS":PRINT
 1860 PRINT"THAT SHOW UP AS WHITE ON LANDSAT IMAGES":PRINT:GOSUB9999
 1870 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO1840
 1880 IFX$="TRUE"THEN GOSUB10050
 1890 PRINT"THERE ARE MANY THINGS THAT SHOW UP AS":PRINT
 1900 PRINT"WHITE IN AN  IMAGE. SOME OTHERS ARE":PRINT
 1910 PRINT"CLOUDS,DESERTS,SALT FLATS AND BEACHES.":GOSUB10000
 1920 PRINT"LET US EXAMINE MANMADE FEATURES THAT CAN"
 1930 PRINT"BE SENSED BY THE LANDSAT. SOME AREAS ARE"
 1940 PRINT"TOO SMALL TO BE DETECTED BY THE MSS.":GOSUB10000
 1950 PRINT"A CITY OR TOWN WILL HAVE A GRAY TO BLUE":PRINT
 1960 PRINT"COLOUR IN THE IMAGES. TRUE OR FALSE.":PRINT:GOSUB9999
 1970 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO1950
 1980 IFX$="TRUE"THEN GOSUB10050
 1990 PRINT"STRAIGHT LINES ARE USUALLY ROADS OR":PRINT'
 2000 PRINT"RAILROADS. TRUE OR FALSE?":PRINT:GOSUB9999
 2010 IFX$<>"TRUE"THENGOSUB10150:PRINT"⊐":GOTO1990
 2020 IFX$="TRUE"THEN GOSUB10050
 2030 PRINT"WE CAN FIND EVIDENCE OF THE OLD FRENCH":PRINT
 2040 PRINT"SETTLEMENT PATTERNS IN THE WINNIPEG":PRINT
 2050 PRINT"IMAGES. THEY APPEAR AS LONG NARROW LOTS":PRINT
 2060 PRINT"ALONG THE RIVERS NEAR WINNIPEG.":PRINT:GOSUB9999
 2070 IFX$<>"TRUE"THEN GOSUB10150:PRINT"⊐":GOTO2030
 2075 IFX$="TRUE"THEN GOSUB10050
 2080 PRINT"WELL I THINK I HAVE COVERED ALL THE":PRINT
 2090 PRINT"IMPORTANT POINTS. THIS MEANS THAT IT IS":PRINT
 2100 PRINT"TIME FOR YOU TO TAKE THE FINAL QUIZ.":PRINT
 2110 PRINT"REMEMBER TO WORK CAREFULLY.":PRINT
 2120 PRINT"GOOD LUCK, "A$".":GOSUB10000
 2130 POKE216,9:PRINT:PRINT"JUST HANG ON A SECOND WHILE I SORT":PRINT
```

```
READY.

 2140 PRINT"OUT SOME QUESTIONS FOR THE QUIZ.":PRINT
 2150 DLOAD"OMQU"
 9999 OPEN1,0:INPUT#1,X$:PRINT:CLOSE 1:RETURN
 10000 POKE 216,23:PRINT:POKE 198,6
 10001 PRINT"PRESS SPACE BAR TO CONTINUE"
 10003 GET X$:IF X$=""THEN 10003
 10004 IF X$=" "THEN PRINT"⅃":RETURN
 10005 GOTO10003
 10050 PRINT"⅃"
 10052 POKE216,4:PRINT:POKE198,10
 10055 PRINTTAB(10)"           ◤ "
 10060 PRINTTAB(10)"     ┌────┐"
 10065 PRINTTAB(10)"    ┴▒▒▒▒▒▒┴  ┌──────┐"
 10070 PRINTTAB(10)"     XXXXXX   |YOU'VE|"
 10075 PRINTTAB(10)"      /  \    |      |"
 10080 PRINTTAB(10)"     /    \   |  GOT |"
 10085 PRINTTAB(10)"    ◥ ▒▒▒▒▒▒ ◤|      |"
 10090 PRINTTAB(10)"     \<▪  ▪>/ |  IT! |"
 10095 PRINTTAB(10)"      \    /  |      |"
 10100 PRINTTAB(10)"      <╰──╯> //──────┘"
 10105 PRINTTAB(10)"       \ /─────  "
 10115 PRINTTAB(10)"        ▛▜ "
 10120 PRINTTAB(10)"       ╭─  ─╮"
 10125 PRINTTAB(10)"       |\▒▒/|"
 10130 PRINTTAB(10)"        ┘  └"
 10135 GOTO 10000
 10150 PRINT"⅃"
 10152 POKE216,4:PRINT:POKE198,10
 10155 PRINTTAB(10)"          ◤      "
 10160 PRINTTAB(10)"    ┌────┐      "
 10165 PRINTTAB(10)"   ┴▒▒▒▒▒▒┴         "
 10170 PRINTTAB(10)"   XXXXXXXX  ┌──────┐ "
 10175 PRINTTAB(10)"    /    \   |THAT'S| "
 10180 PRINTTAB(10)"   /      \  | NOT  |"
 10185 PRINTTAB(10)"  ◥ ▒▒  ▒▒ ◤ |  IT  | "
 10190 PRINTTAB(10)"   \> ▪▼▪ </ |______┘ "
 10195 PRINTTAB(10)"    \  ◡  / //        "
 10200 PRINTTAB(10)"    <  ◠  > //        "
 10205 PRINTTAB(10)"     \ ◡ /────        "
 10215 PRINTTAB(10)"       ▛▜             "
 10220 PRINTTAB(10)"     ╭─  ─╮           "
 10225 PRINTTAB(10)"     |\▒▒/|           "
 10230 PRINTTAB(10)"      ┘  └            "
 10235 GOTO 10000
```

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2 REM COPYRIGHT BRIAN BURKE 1983
3 REM OMQU IS FINAL QUIZ.
5 POKE144,88:POKE59468,12
10 PRINT"⊐":POKE216,10:PRINT:POKE198,6:PRINT"REMEMBER TO WORK CAREFULLY.":PRINT
20 PRINT"    CHECK YOUR SPELLING AND CORECT IT":PRINT
30 PRINT"     BEFORE YOU PRESS THE RETURN KEY.":GOSUB10000
40 LETK=0
50 PRINT"TYPE IN THE LETTER OF THE ANSWER THAT":PRINT
60 PRINT"BEST ANSWERS THE QUESTION.":PRINT
70 PRINT"DIGITAL DATA IS INFORMATION THAT IS:-":PRINT
80 PRINT"A. IN THE FORM OF LETTERS.":PRINT
90 PRINT"B. IN THE FORM OF WORDS.":PRINT
100 PRINT"C. IN THE FORM OF NUMBERS.":PRINT
110 PRINT"D.IN THE FORM OF SOUNDS.":PRINT
120 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO50
130 IFX$="C"THEN K=K+1:PRINT"⊐":GOTO150
140 IFX$<>"C"THEN PRINT"⊐":GOTO150
150 PRINT"THE NUMBER OF PRIMARY COLOURS ARE:-":PRINT
160 PRINT"A.  FIVE":PRINT
170 PRINT"B.  FOUR":PRINT
180 PRINT"C.  THREE":PRINT
190 PRINT"D.  TWO":PRINT
200 PRINT"E.  ONE":PRINT
210 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO150
220 IFX$="C"THEN K=K+1:PRINT"⊐":GOTO240
230 IFX$<>"C"THEN PRINT"⊐":GOTO240
240 PRINT"THE MSS ON THE LANDSAT USES A MIRROR TO":PRINT
250 PRINT"A.  REFLECT THE LIGHT":PRINT
260 PRINT"B.  REFRACT THE LIGHT":PRINT
270 PRINT"C.  RETRACT THE LIGHT":PRINT
280 PRINT"D.  NONE OF THE ABOVE":PRINT
290 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO240
300 IFX$="A"THEN K=K+1:PRINT"⊐":GOTO320
310 IFX$<>"A"THEN PRINT"⊐":GOTO320
320 PRINT"THE LANDSAT 4 WAS LAUNCHED IN:-":PRINT
330 PRINT" A. 1983":PRINT
340 PRINT" B. 1982":PRINT
350 PRINT" C. 1981":PRINT
360 PRINT" D. 1980":PRINT
370 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO320
380 IFX$="B"THENK=K+1:PRINT"⊐":GOTO400
390 IFX$<>"B"THEN PRINT"⊐":GOSUB400
400 PRINT"CAN LANDSAT TECHNOLOGY BE USED BY":PRINT
410 PRINT"PEOPLE IN :-":PRINT
420 PRINT"A. FORESTRY.":PRINT
430 PRINT"B. AGRICULTURE.":PRINT
440 PRINT"C. WATER MANAGEMENT.":PRINT
450 PRINT"D. ALL OF THE ABOVE.":PRINT
460 PRINT"E. NONE OF THE ABOVE.":PRINT
470 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO400
480 IFX$="D"THEN K=K+1:PRINT"⊐":GOTO500
490 IFX$<>"D"THEN PRINT"⊐":GOTO500
500 PRINT"IF YOU SEE AN AREA OF MAGENTA IN A":PRINT
510 PRINT"SUMMER IMAGE YOU CAN IDENTIFY IT AS:-":PRINT
```

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READY.

 520 PRINT"A.  PALM TREES.":PRINT
 530 PRINT"B.  EVERGREEN TREES.":PRINT
 540 PRINT"C.  BROADLEAF TREES.":PRINT
 550 PRINT"D.  NONE OF THE ABOVE.":PRINT
 560 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO500
 570 IFX$="B"THEN K=K+1:PRINT"⊐":GOTO590
 580 IFX$<>"B"THEN PRINT"⊐":GOTO590
 590 PRINT"IF YOU SEE A THIN DARK BLUE TO BLACK":PRINT
 600 PRINT"LINE IN A LANDSAT IMAGE IT COULD BE:-":PRINT
 610 PRINT"A. A HIGHWAY.":PRINT
 620 PRINT"B. A RAILROAD.":PRINT
 630 PRINT"C. AN AIRFIELD RUNWAY.":PRINT
 640 PRINT"D. A CANAL.":PRINT
 650 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO590
 660 IFX$="D"THEN K=K+1:PRINT"⊐":GOTO680
 670 IFX$<>"D"THEN PRINT"⊐":GOTO680
 680 PRINT"WHEN USING LANDSAT IMAGERY IT IS HELPFUL"
 690 PRINT"TO KNOW:-":PRINT
 700 PRINT"A. THE TIME OF THE DAY.":PRINT
 710 PRINT"B. THE TIME OF THE MONTH.":PRINT
 720 PRINT"C. THE TIME OF YOUR LIFE.":PRINT
 730 PRINT"D. THE TIME OF THE YEAR.":PRINT
 740 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO680
 750 IFX$="D"THENK=K+1:PRINT"⊐":GOTO770
 760 IFX$<>"D"THEN PRINT"⊐":GOTO770
 770 PRINT"AREAS THAT ARE BLACK IN COLOUR AND DO":PRINT
 780 PRINT"NOT HAVE A REGULAR SHAPE, ON A LANDSAT":PRINT
 790 PRINT"IMAGE, USUALLY ARE:-":PRINT
 800 PRINT" A. WATER.":PRINT
 810 PRINT" B. BARE SOIL.":PRINT
 820 PRINT" C. EVERGREEN FORESTS.":PRINT
 830 PRINT" D. ALL OF THE ABOVE.":PRINT
 840 PRINT" E. NONE OF THE ABOVE.":PRINT
 850 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO770
 860 IFX$="A"THENK=K+1:PRINT"⊐":GOTO880
 870 IFX$<>"A"THEN PRINT"⊐":GOTO880
 880 PRINT"THERE IS AN AREA THAT IS PINK ON THE":PRINT
 890 PRINT"FALL LANDSAT IMAGE. THIS SHOWS AN AREA:-"
 900 PRINT"A. WHERE THE HARVEST HAS BEGUN.":PRINT
 1000 PRINT"B. WHERE THERE ARE TREES.":PRINT
 1010 PRINT"C. WHERE THEY ARE GROWING FLOWERS.":PRINT
 1020 PRINT"D. ALL OF THE ABOVE.":PRINT
 1030 PRINT"E. NONE OF THE ABOVE.":PRINT
 1040 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO890
 1042 IFX$="A"THENK=K+1:PRINT"⊐":GOTO1050
 1045 IFX$<>"A"THENPRINT"⊐":GOTO880
 1050 PRINT"IF YOU SEE AN IMAGE WITH A BLUISH TINGE":PRINT
 1060 PRINT"ALL OVER IT IS THE RESULT OF:-":PRINT
 1070 PRINT"A. SNOW COVER.":PRINT
 1080 PRINT"B. CLOUD COVER.":PRINT
 1090 PRINT"C. SAND COVER.":PRINT
 2000 PRINT"D. BOOK COVER.":PRINT
 2010 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO1050
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READY.

 2020 IFX$="A"THEN K=K+1:PRINT"⊐":GOTO2040
 2030 IFX$<>"A"THENPRINT"⊐":GOTO2040
 2040 PRINT"WHICH OF THE FOLLOWING CAN NOT BE SHOWN":PRINT
 2050 PRINT"ON A SCREEN.":PRINT
 2060 PRINT"A. INFRARED ENERGY.":PRINT
 2070 PRINT"B. ULTRA VIOLET ENERGY.":PRINT
 2080 PRINT"C. RADAR ENERGY.":PRINT
 2090 PRINT"D. ALL OF THE ABOVE.":PRINT
 2100 PRINT"E. NONE OF THE ABOVE.":PRINT
 2110 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO2040
 2120 IFX$="E"THEN K=K+1:PRINT"⊐":GOTO2140ADY.
 2130 IFX$<>"E"THEN PRINT"⊐":GOTO2140
 2140 PRINT"IF YOU SAW A STRAIGHT NARROW WHITE LINE":PRINT
 2150 PRINT"ON A LANDSAT IMAGE IT COULD BE:-":PRINT
 2160 PRINT"A. A HIGHWAY.":PRINT
 2170 PRINT"B. A ROAD.":PRINT
 2180 PRINT"C. A RAILROAD.":PRINT
 2190 PRINT"D. ALL OF THE ABOVE.":PRINT
 2200 PRINT"E. NONE OF THE ABOVE.":PRINT
 2210 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO2140
 2220 IFX$="D"THEN K=K+1:PRINT"⊐":GOTO2240
 2230 IFX$<>"D"THENPRINT"⊐":GOTO2240
 2240 PRINT"THE USUAL SCALE OF THE LANDSAT IMAGES":PRINT
 2250 PRINT"THAT WE HAVE BEEN WORKING WITH IS:-":PRINT
 2260 PRINT" A. 1 TO     10 000":PRINT
 2270 PRINT" B. 1 TO    100 000":PRINT
 2280 PRINT" C. 1 TO  1 000 000":PRINT
 2290 PRINT" D. 1 TO 10 000 000":PRINT
 2300 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO2240
 2310 IFX$="C"THEN K=K+1:PRINT"⊐":GOTO2330
 2320 IFX$<>"C"THENPRINT"⊐":GOTO2330
 2330 PRINT"AN AREA OF BLUISH GREY ON AN IMAGE IS":PRINT
 2340 PRINT"USUALLY :-":PRINT
 2350 PRINT"A. A TOWN.":PRINT
 2360 PRINT"B. A CITY.":PRINT
 2370 PRINT"C. A BUILT UP AREA.":PRINT
 2380 PRINT"D. ALL OF THE ABOVE.":PRINT
 2390 PRINT"E. NONE OF THE ABOVE.":PRINT
 2400 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO2330
 2410 IFX$="D"THEN K=K+1:PRINT"⊐":GOTO2430
 2420 IFX$<>"D"THENPRINT"⊐":GOTO2430
 2430 PRINT"IN A LANDSAT IMAGE THERE IS A LARGE":PRINT
 2440 PRINT"AREA OF BLACK. IN THIS THERE IS A LIGHT":PRINT
 2450 PRINT"BLUE FAN SHAPED AREA. IT IS :-":PRINT
 2460 PRINT"A. RAIN.":PRINT
 2470 PRINT"B. WIND.":PRINT
 2480 PRINT"C. CONDENSATION.":PRINT
 2490 PRINT"D. SEDIMENT.":PRINT
 2500 GOSUB9999:IFX$=""THENPRINT"⊐":GOTO2430
 2510 IFX$="D"THEN K=K+1:PRINT"⊐":GOTO2530
 2520 IFX$<>"D"THENPRINT"⊐":GOTO2530
 2530 PRINT"BRIGHT RED IN AN IMAGE INDICATES :-":PRINT
 2540 PRINT"A. HEALTHY VEGETATION.":PRINT
 2550 PRINT"B. DISEASED VEGETATION.":PRINT
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READY.

 2560 PRINT"C. DESERTS.":PRINT
 2570 PRINT"D. WATER BODIES.":PRINT
 2580 GOSUB9999:IFX$=""THENPRINT"ℷ":GOTO2530
 2590 IFX$="A"THENK=K+1:PRINT"ℷ":GOTO2610
 2600 IFX$<>"A"THENPRINT"ℷ":GOTO2610
 2610 PRINT"THE IMAGE HAS A LARGE AREA OF WHITE ON":PRINT
 2620 PRINT"IT. THIS COULD INDICATE :-":PRINT
 2630 PRINT"A. CLOUDS.":PRINT
 2640 PRINT"B. DESERT.":PRINT
 2650 PRINT"C. SNOW.":PRINT
 2660 PRINT"D. ALL OF THE ABOVE.":PRINT
 2670 PRINT"E. NONE OF THE ABOVE.":PRINT
 2680 GOSUB9999:IFX$=""THENPRINT"ℷ":GOTO2610
 2690 IFX$="E"THENK=K+1:PRINT"ℷ":GOTO2710
 2700 IFX$<>"E"THENPRINT"ℷ":GOTO2710
 2710 PRINT"A LANDSAT IMAGE SHOWS AN AREA ON THE":PRINT
 2720 PRINT"SURFACE OF THE EARTH THAT IS :-":PRINT
 2730 PRINT"A. 185 X 185 KM.":PRINT
 2740 PRINT"B. 200 X 200 KM.":PRINT
 2750 PRINT"C. 100 X 100 KM.":PRINT
 2760 PRINT"D. ALL OF THE ABOVE.":PRINT
 2770 PRINT"E. NONE OF THE ABOVE.":PRINT
 2780 GOSUB9999:IFX$=""THENPRINT"ℷ":GOTO2720
 2790 IFX$="A"THEN K=K+1:PRINT"ℷ":GOTO2810
 2800 IFX$<>"A"THEN PRINT"ℷ":GOTO2810
 2810 PRINT"THE MSS ON THE LANDSAT SATELLITE ":PRINT
 2820 PRINT"SENSES IN HOW MANY SPECTRAL BANDS  :-":PRINT
 2830 PRINT"A. TWO.":PRINT
 2840 PRINT"B. THREE.":PRINT
 2850 PRINT"C. FOUR.":PRINT
 2860 PRINT"D. FIVE.":PRINT
 2870 GOSUB9999:IFX$=""THENPRINT"ℷ":GOTO2810
 2880 IFX$<>"C"THENPRINT"ℷ":GOTO2900
 2890 IFX$="C"THENK=K+1:PRINT"ℷ":GOTO2900
 2900 IFK<10GOTO3030
 3000 IFK>10 - K<15GOTO3040
 3010 IFK>15 - K<18GOTO3050
 3020 IFK>18GOTOGOTO3060
 3030 PRINT"THAT WAS GOOD. YOUR SCORE IS":PRINT
 3031 PRINTK:PRINT:PRINT"OUT OF 20.":GOSUB10000:GOTO3070
 3040 PRINT"THAT WAS VERY GOOD. YOUR SCORE IS":PRINT
 3041 PRINTK:PRINT:PRINT"OUT OF 20.":GOSUB10000:GOTO3070
 3050 PRINT"THAT WAS VERY WELL DONE. YOU SCORED":PRINT
 3051 PRINTK:PRINT:PRINT"OUT OF 20.":GOSUB10000:GOTO3070
 3060 PRINT"THAT WAS EXCELLENT! YOUR SCORE IS":PRINT
 3061 PRINTK:PRINT:PRINT"OUT OF 20.":GOSUB10000:GOTO3070
 3070 POKE216,10:PRINT:POKE198,6:PRINT"THAT IS THE END OF THIS C,A,I.":PRINT
 3080 POKE216,12:PRINT:POKE198,10:PRINT"I HOPE YOU ENJOYED IT.":GOSUB10000
 3090 PRINT"ℷ"
 9999 OPEN1,0:INPUT#1,X$:PRINT:CLOSE 1:RETURN
 10000 POKE216,23:PRINT:POKE198,6
 10001 FORI=1TO10:GETC$:NEXTI
 10002 PRINT"PRESS SPACE BAR TO CONTINUE"
 10003 GETX$:IFX$<>" " THEN10003:IFX$=" " THEN PRINT"ℷ":RETURN
READY.
```